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Subject:

2018 Annual Operation Maintenance and Monitoring Report,
Operable Unit 2, Northrop Grumman Systems Corporation and Naval Weapons
Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.
(NYSDEC Site #s 1-30-003A and B)

ENVIRONMENT

Dear Jason:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), Arcadis is providing the NYSDEC with the 2018 Annual Operation Maintenance and Monitoring Report (Report). This Report was prepared to document the operation, maintenance, and monitoring (OM&M) activities conducted for the on-site portion of the Operable Unit 2 (OU2) groundwater remedy and the results of ongoing volatile organic compound (VOC) and inorganic monitoring in groundwater to meet the remedial objectives set forth in the March 2001 OU2 Record of Decision (ROD).

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March 29, 2019

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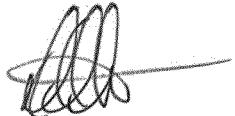
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Mr. Jason Pelton
March 29, 2019

Please contact us if you have any questions or comments.

Sincerely,

Arcadis of New York, Inc.



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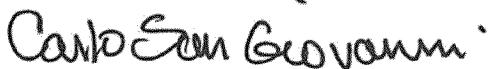
Operable Unit 2 - Groundwater
Bethpage, New York
NYSDEC Sites # 1-30-003A and 1-30-003B

March 29, 2019

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2



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2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT

Operable Unit 2

Northrop Grumman Systems Corporation
Bethpage, New York
NYSDEC Site # 1-30-003A

Naval Weapons Industrial Reserve Plant
Bethpage, New York
NYSDEC Site # 1-30-003B

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March 29, 2019

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2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

CONTENTS

1	INTRODUCTION.....	1
2	SITE OVERVIEW.....	2
2.1	Description of Site.....	2
2.2	Nature and Extent of Impacted Groundwater	2
2.3	Remedial Action Objectives.....	2
2.4	Main Features/Components of the Remedy.....	3
3	OPERATION AND MAINTENANCE	4
3.1	Summary of O&M Completed.....	4
3.2	Performance Evaluation	5
4	MONITORING.....	6
4.1	Summary of Monitoring Completed	6
4.2	Summary of Monitoring Results.....	8
4.2.1	Remedial System Performance Monitoring.....	8
4.2.2	Remedial System Compliance Monitoring	9
4.2.2.1	Water Discharge.....	9
4.2.2.2	Air Discharge	9
4.2.3	Hydraulic Monitoring and Groundwater Flow	10
4.2.4	ONCT Hydraulic Effectiveness Program.....	12
4.2.5	Groundwater Quality.....	14
4.2.5.1	Volatile Organic Compounds.....	14
4.2.5.1.1	Shallow/Intermediate Zones	14
4.2.5.1.2	Deep and Deep2 Zones.....	15
4.2.5.2	Outpost Well Monitoring	16
4.2.5.3	Cadmium and Chromium.....	17
4.2.5.4	Tentatively Identified Compounds	18
4.2.5.5	1,4-Dioxane	18
4.2.5.6	Vinyl Chloride Monomer	18
4.2.5.7	QA/QC Samples and Data Validation.....	19
5	CONCLUSIONS.....	19

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

6	Certification Statement.....	21
7	References.....	22

TABLES

- Table 1A. Summary of Weekly Monitoring Data 2018, Tower 96 Treatment System
- Table 1B. Summary of Weekly Monitoring Data 2018, Tower 102 Treatment System
- Table 2. Summary of Non-Routine Maintenance, 2018, ONCT Treatment System, Operable Unit 2
- Table 3. Operational Summary for the On-Site Portion of the OU2 Groundwater Remedy, Fourth Quarter and Annual 2018
- Table 4. Concentrations of Constituents in Remedial Wells and Treatment System Effluents, 2018, Operable Unit 2
- Table 5A. Summary of Influent and Mid-Effluent Air Concentrations and Effluent Air Emissions 2018, Tower 96 Treatment System
- Table 5B. Summary of Influent Air Concentrations and Effluent Air Emissions 2018, Tower 102 Treatment System
- Table 5C. Summary of TCE Mass Removal, Tower 96 Treatment System, Annual 2018
- Table 5D. Summary of TCE Mass Removal, Tower 102 Treatment System, Annual 2018
- Table 6A. Summary of AERMOD Air Quality Impact Analysis, Tower 96 Treatment System, Operable Unit 2
- Table 6B. Summary of AERMOD Air Quality Impact Analysis, Tower 102 Treatment System, Operable Unit 2
- Table 7. Summary of SPDES Equivalency Effluent Water Sample Analytical Results 2018, ONCT Treatment System
- Table 8. Water-Level Measurement Data and Remedial Well Specific Capacities, April 30 to May 1, 2018
- Table 9. Water-Level Measurement Data and Remedial Well Specific Capacities, October 9 to October 10, 2018
- Table 10. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Wells in the Shallow Zone
- Table 11. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Wells in the Intermediate Zone
- Table 12. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Wells in the Deep Zone

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Wells in the Deep 2 Zone
- Table 14. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Outpost Wells
- Table 15. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells
- Table 16. Concentrations of 1,4-Dioxane in Groundwater Samples Collected from Monitoring Wells and Remedial Wells
- Table 17. Comparison of Fourth Quarter Field Measured 2018 Vertical Hydraulic Gradients to Model-Predicted Gradients
- Table 18A. Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples
- Table 18B. Concentrations of Metals in Blank Samples
- Table 19. Scope and Rationale for 2019 Suggested Modifications to the Operable Unit 2 Groundwater Monitoring Plan

FIGURES

- Figure 1. Locations of Treatment System and Discharges
- Figure 2. ONCT Groundwater Extraction and Treatment System Site Plan
- Figure 3. ONCT Groundwater Extraction and Treatment System Schematic
- Figure 4. Remedial Wells Total VOC Mass Recovery Rates Through December 2018
- Figure 5. Remedial Wells Yearly Total VOC Mass Removed Through December 2018
- Figure 6. Remedial Wells Cumulative Total VOC Mass Removed Through December 2018
- Figure 7. Total Volatile Organic Compound Concentrations (Southern and Southwestern Site Boundary) in On-Site Deep 2 Monitoring Wells and OU2 Remedial Wells
- Figure 8. Total Volatile Organic Compound Concentrations (Southern and Southeastern Site Boundary) in On-Site/Near Site Deep and Deep 2 Monitoring Wells and OU2 Remedial Wells
- Figure 9. Water Table Elevation and Generalized Horizontal Groundwater Flow Directions in the Shallow/Intermediate Zone, October 2018
- Figure 10. Potentiometric Surface Elevation and Generalized Horizontal Groundwater Flow Directions in the Deep 2 Zone, October 2018
- Figure 11. Cross Sections Lines and Maximum Total Volatile Organic Compound Concentrations
- Figure 12. TVOCs in Groundwater 2018 Cross-Section A-A'
- Figure 13. TVOCs in Groundwater 2018 Cross-Section B-B'
- Figure 14. Deep Zone Maximum TVOC Concentrations 2018

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Figure 15. Deep 2 Zone Maximum TVOC Concentrations 2018
- Figure 16. Deep 3 Zone Maximum TVOC Concentrations 2018
- Figure 17. Model Simulated Groundwater Elevations and Groundwater Capture Zone: At the End of 2018 – Layers 5 through 8
- Figure 18. Total Volatile Organic Compound Concentrations in On-Site Intermediate Monitoring Wells
- Figure 19. Total Volatile Organic Compound Concentrations in Off-Site Deep Monitoring Wells (Southeast of the Site)
- Figure 20. Total Volatile Organic Compound Concentrations in Off-Site Deep2 Monitoring Wells (Southeast of the Site)
- Figure 21. Total Volatile Organic Compound Concentrations in Off-Site Deep and Deep2 Monitoring Wells (South of the Site)
- Figure 22. Total Volatile Organic Compound Concentrations in GM-38 Area Deep and Deep2 Monitoring Wells
- Figure 23. TVOCs Concentrations in Outpost Wells BPOW1-1, BPOW1-2, BPOW1-3, BPOW1-4, BPOW1-5 and BPOW1-6 (Wells monitor SFWD Well Field 1)
- Figure 24. TVOCs Concentrations in Outpost Wells BPOW2-1, BPOW2-2 and BPOW2-3 (Wells Monitor SFWD Well Field 3)
- Figure 25. TVOCs Concentrations in Outpost Wells BPOW3-1, BPOW3-2, BPOW3-3 and BPOW3-4 (Wells Monitor NYAW Seaman's Neck Well Field)
- Figure 26. TVOCs Concentrations in Outpost Wells BPOW4-1R and BPOW4-2R (Wells Monitor Town of Hempstead Levittown Water District Well N-5303)
- Figure 27. Total Cadmium (unfiltered) Concentrations in Shallow Monitoring Wells Near Former Plant 2
- Figure 28. Total Chromium (unfiltered) Concentrations in Shallow Monitoring Wells Near Former Plant 2
- Figure 29. Total Chromium (unfiltered) Concentrations in Shallow Monitoring Wells Near Former Plant 1

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

APPENDICES

- Appendix A Daily and Monthly Logs
- Appendix B Hazardous Waste Manifests
- Appendix C OU2 ONCT System Capture Analysis for 2018
- Appendix D SPDES Discharge Monitoring Reports
- Appendix E 2018 Groundwater Sampling Logs and Chain of Custody Records
- Appendix F Supplemental Trend Graphs

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

1 INTRODUCTION

Arcadis of New York, Inc. (Arcadis) on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), has prepared this OU2 2018 Annual Operation, Maintenance and Monitoring Report to document the operation, maintenance, and monitoring (OM&M) activities conducted for the on-site portion of the Operable Unit 2 (OU2) groundwater remedy for the former Northrop Grumman, Bethpage, New York facility (Site No. 1-30-003A) and the former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage New York (Site No. 1-30-003B) (herein referred to as the "Site"). This report has been prepared consistent with the requirements stipulated in the March 2001 OU2 Record of Decision (ROD) issued for the Site by the New York State Department of Environmental Conservation (NYSDEC) in 2001.

This report also documents the results of:

- Groundwater monitoring of metals near former Northrop Grumman Plants 1 and 2;
- Groundwater monitoring of volatile organic compounds (VOCs) in downgradient (off-site) areas; and
- Groundwater monitoring of VOCs in outpost wells upgradient of public water supply well fields.

The above activities were conducted by Northrop Grumman to meet the remedial action objectives (RAOs) set forth in the March 2001 OU2 Record of Decision (ROD) (NYSDEC 2001), and in accordance with the (OM&M) Manual (Arcadis 2014a) and associated Groundwater Monitoring Plan (Arcadis 2014b,) Groundwater Monitoring Plan Addendum in August 2015 (NYSDEC, 2015b), and the latest (June 2016) Updated Groundwater Monitoring Plan (Arcadis 2016a). The above-referenced OM&M manual and monitoring plans were submitted to the New York State Department of Environmental Conservation (NYSDEC) pursuant to the OU2 Administrative Order on Consent (NYSDEC 2015a) Index # W1-118-14-12, executed April 21, 2015 (NYSDEC 2015a). The NYSDEC conditionally approved the Groundwater Monitoring Plan Addendum in August 2015 (NYSDEC, 2015b).

This report describes the performance and effectiveness monitoring of the on-site portion of the OU2 groundwater remedy (also referred to as the On-Site Containment [ONCT] system) for the Fourth Quarter 2018 (current period) and the Year 2018 (reporting period). As such, this report is the fourth quarter report for 2018 and is also the 2018 Annual Report and provides the basis to prepare an annual engineering certification of the ONCT system, as required by the OU2 AOC, and as warranted by evaluation of the data herein. In the report, the current period data was compared to data in the previous three 2018 quarterly reports issued by ARCADIS (2018b; 2018c; 2018d) and to longer-term data trends (also referred to as the period of record), as applicable.

This report does not summarize the activities conducted by the Navy at the former NWIRP property nor the ROD-required off-site components of the groundwater remedial program as these activities are managed and maintained by the Navy. The Navy activities include monitoring of the GM-38 hotspot, OM&M of the GM-38 groundwater extraction and treatment system, monitoring of VOC-impacted groundwater identified in the vicinity of Navy's Vertical Profile Borings (VPB) VBP-139 and VBP-142 (also referred to as the RE-108 hot spot), off-site groundwater investigation, and components of the public water supply contingency plan (i.e., additional outpost well installation and monitoring).

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT OPERABLE UNIT 2

2 SITE OVERVIEW

This section provides a brief description of the Site, relevant history, main features/components, and describes the remedial action objectives (RAOs) specified in the OU2 ROD.

2.1 Description of Site

The former Grumman Aerospace Corporation (now the Northrop Grumman Systems Corporation) (NYSDEC Site # 1-30-003A) occupied approximately 600 acres in east-central Nassau County, in the Hamlet of Bethpage, Town of Oyster Bay, New York and within it was the NWIRP which occupied approximately 105 acres. The Site was bounded by Stewart Avenue to the north, South Oyster Bay Road to the west, Route 107 to the southwest, Central Avenue to the south, and various residential and commercial areas to the east. Currently, Northrop Grumman occupies and/or owns the parcels identified on **Figure 1**. The former NWIRP (NYSDEC Site # 1-30-003B) site is located adjacent to the former Northrop Grumman site. Also, the former Occidental Chemical Corporation (OXY)/Hooker Chemical Corporation/RUCO Polymer Corporation site (referred to throughout this report as the OXY Site) (NYSDEC Site # 1-30-0004) is located adjacent to and generally hydraulically upgradient of the former Northrop Grumman site.

2.2 Nature and Extent of Impacted Groundwater

Groundwater sampling conducted as part of the Remedial Investigations (RIs) for the former Northrop Grumman, NWIRP, and OXY sites indicates that past chemical storage and/or waste disposal at each of these sites has resulted in impacts to groundwater (i.e., the upper glacial and Magothy aquifers). The primary groundwater constituents of concern (COCs), based on concentrations and frequency of detection, for the former Northrop Grumman and NWIRP sites are chlorinated volatile organic compounds (VOCs), mainly: trichloroethene (TCE); tetrachloroethene (PCE); 1,1,1-trichloroethane (1,1,1-TCA); 1,2-dichloroethene (1,2-DCE); 1,1-dichloroethene (1,1-DCE); and 1,1-dichloroethane (1,1-DCA).

Groundwater associated with the former OXY site contains these COCs as well, with the addition of vinyl chloride monomer (VCM; also referred to herein as vinyl chloride). Metals are COCs in the groundwater near former Northrop Grumman Plants 1 and 2 (chromium and cadmium/chromium, respectively). The 1994 RI Report (Geraghty & Miller 1994) describes the overall extent (on-site and off-site) of groundwater impacts prior to remediation.

2.3 Remedial Action Objectives

The overall remedial goals for groundwater, as stated in the OU2 ROD, is to meet Standards, Criteria, and Guidance values (SCGs) and be protective of human health and the environment.

Consistent with the remedial goals selected for the Site, the remedial action objectives (RAOs) for OU2, either in whole or in part, are to:

- Eliminate, to the extent practicable, site-related constituents from the affected public water supplies and prevent, to the extent practicable, the future impacts to public water supplies.
- Eliminate, to the extent practicable, exposures to impacted groundwater.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Eliminate, to the extent practicable, off-site migration of impacted groundwater and, where practicable, restore the groundwater to pre-disposal conditions.
- Eliminate, to the extent practicable, the off-site migration of soils impacts entering the groundwater.
- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of constituents to the waters of the state.
- Comply with applicable NYSDEC SCGs for OU2 ONCT system treated water and air. The discharge requirements for water and air are provided in the OM&M Manual (Arcadis 2014a).

2.4 Main Features/Components of the Remedy

Based on the OU2 ROD, and as presented on **Figures 2 and 3**, the following are the main features and components of the OU2 On-Site Groundwater Remedy, which is designed to actively remediate the on-site portion of the VOC-impacted groundwater:

- Operation, maintenance and monitoring of the OU2 ONCT system to address the on-site impacted groundwater. The OU2 ONCT system consists of:
 - Five Remedial Wells (1, 3R, 17, 18, and 19) with design (groundwater model-based) pumping rates of 800 gallons per minute (gpm), 700 gpm, 1,000 gpm, 600 gpm and 700 gpm, respectively.
Remedial Well 3R was brought online in 2013 to replace Remedial Well 3 due to the declining specific capacity of Remedial Well 3.
 - Two treatment systems (Tower 96 and Tower 102), each consisting of a packed tower air stripper to remove VOCs from the extracted groundwater and a regenerable vapor-phase granular activated carbon (RVPGAC) system, with on-site steam regeneration via on-site boilers, to remove VOCs from the air stripper off-gas emissions.
 - Supplemental air treatment at Tower 96, consisting of two vapor-phase granular activated carbon (VPGAC) polishing beds maintained by Northrop Grumman. Previously treatment (provided by OXY) had consisted of VPGAC and potassium permanganate-impregnated zeolite (PPZ). The OXY carbon unit was removed from service on January 26, 2017 and subsequently the PPZ was removed on March 23, 2017.
 - A pressurized, discharge main to accept the treated water discharge and for limited non-potable reuse.
 - Two sets of recharge basins (the South Basins [primary] and the West Basins [secondary]) to accept the treated water from the clear-wells which drain by gravity to the basins.
- A groundwater monitoring program to assess the overall OU2 On-Site Groundwater Remedy environmental effectiveness and a performance and compliance monitoring program at the treatment plants. The groundwater monitoring program also includes monitoring upgradient of public water supply wells. These wells were initially installed to serve as outpost wells and sampled in accordance with the Public Water Supply Contingency Plan (PWSCP) (Arcadis G&M, Inc., 2003a). However, these wells have served the purpose outlined in the PWSCP and were repurposed as plume monitoring wells in 2015. The monitoring and former outpost wells included in Northrop Grumman's

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

OU2 groundwater monitoring program, for which Northrop Grumman is responsible for reporting, and additional wells in the Site vicinity are shown on **Figure 1**. Monitoring or outpost wells for which Navy has responsibility for reporting are not shown on **Figure 1**.

3 OPERATION AND MAINTENANCE

The following subsections provide a summary of the routine and non-routine operation and maintenance activities completed during the 2018 reporting period to meet requirements outlined in the OM&M Manual (Arcadis 2014a), as well as a performance evaluation of the remedial treatment systems.

3.1 Summary of O&M Completed

The O&M of the ONCT system was conducted in accordance with the OU2 ONCT OM&M Manual (Arcadis 2014a), and consisted of the following:

- Daily site visits to visually check the system for proper operation, leaks, or other potential emergency situations. Additionally, the ONCT system was continuously monitored by the Supervisory Control and Data Acquisition (SCADA) system. Daily site visit logs (paper forms and electronically collected data) are included in **Appendix A**.
- Weekly site checks by Northrop Grumman personnel to monitor and record key process parameters to confirm proper system operation, to assess whether a process parameter is changing, and to provide information that may be helpful later in case there is an operational problem. A summary of the weekly monitoring data collected for Tower 96 and Tower 102 is provided in **Tables 1A and 1B**, respectively.
- Routine maintenance by Northrop Grumman personnel of equipment was performed in accordance with the manufacturers' specifications or otherwise, as needed, and per the OU2 ONCT OM&M Manual (Arcadis 2014a) routine maintenance schedule and checklist.
- Non-routine maintenance of equipment and system components was performed in response to alarm conditions, physical damage, or systems parameters operating outside of their normal operating ranges. A summary of the non-routine maintenance activities completed for Tower 96 and Tower 102 is provided in **Table 2**.
- Non-routine maintenance activities included scraping and sediment removal of the central South Basin and the southern most West Basin. During this time, the central South Basin and the southern most West Basin were taken off line and the eastern and western South Basins along with the northern most West Basin (Outfall 006) were utilized for ONCT discharge. As reported in an email to the NYSDEC dated September 29, 2017, this maintenance was required to improve basin infiltration rate for continued, effective long-term operation of the ONCT system. To facilitate basin maintenance, the pumping rate associated with Well 18 was decreased from 900 gpm to 800 gpm on March 28, 2018 and Well 19 was decreased from 700 gpm to 400 gpm on January 11, 2018 and increased to 500 gpm on March 26, 2018. These flow rates were maintained through 2018 and had been adjusted based on storm water volumes and the ability of the western and eastern South Basins and southern most West Basin to accommodate flow from both storm water and Tower 102 ONCT effluent. A staff

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

gauge was installed in the central South Basin (**Table 2**) and distribution chamber maintenance is expected to be completed during 2019.

- Solvent recovered by the VPGAC system, is characterized as a hazardous waste and was drummed, temporarily staged in a hazardous waste storage area, and properly transported and disposed of off-site by Northrop Grumman subcontractor in accordance with applicable regulations. Copies of the completed hazardous waste manifests are included in **Appendix B**.

3.2 Performance Evaluation

The OU2 ONCT system operation in 2018 was consistent with operation in previous years. An operational summary of the remedial wells, discharges, and treatment system efficiencies for 2018 is provided in **Table 3** and summarized below:

- The remedial wells extracted a total of 1,878 million gallons (MG) of groundwater in 2018. The individual remedial wells pumped at the following annual aggregate percentages of their design volume: Remedial Well 1 (91%), Remedial Well 3R (93%), Remedial Well 17 (100%), Remedial Well 18 (134%), and Remedial Well 19 (72%). In general, the percentage of design volume less than 100 (i.e., Well 1, Well 3R and Well 19) was due to pumping interruptions for routine and non-routine maintenance, particularly the need during the 2018 reporting period to reduce flows to the central South Basin and southern West Basin to facilitate and perform necessary basin maintenance. The T96 system shutdown due to a supplemental blower bearing failure on July 12 through August 1, 2018. A spare blower was utilized and the system operated at 60% capacity from August 1 through August 29, 2018 due to system limitations of the spare blower. The original T96 supplemental blower bearing was repaired and the system returned to full capacity on August 30, 2018 (see **Table 2**). The percentage for Well 18 was greater than 100% because its flow rate was increased in January 2018 to approximately 800 gpm to enhance on-site containment and VOC mass removal. Due to the need for continued basin maintenance and to accommodate a higher pumping rate of Well 18, Well 19's flow rate was reduced by a commensurate amount (200 gpm) during 2018 as it was judged that Well 19's capture zone extended into the OU3 plume and therefore, the well was doing more than required by the OU2 ROD.
- Given that Well 19 was operated at reduced flow rates, compared to design, and because recharge was reduced at the South Basins (58% of design) to accommodate required basin maintenance during 2018, the groundwater flow and solute transport model was used to determine if the ONCT system was effective in meeting its objective of on-site containment of VOC-impacted groundwater under these atypical conditions. This assessment is summarized in Section 4.2.3 with additional details provided in **Appendix C**.
- The OU2 ONCT system operated continuously in 2018, with the exception of brief shutdown periods for routine maintenance, alarm conditions, and Tower 96 supplemental blower bearing failure. The remedial wells operated for the following "uptime" (calculated as a percentage of the reporting period): Remedial Well 1 (91%), Remedial Well 3R (92%), Remedial Well 17 (>99%), Remedial Well 18 (>99%), and Remedial Well 19 (>99%).
- The water treatment components of the OU2 ONCT system (air stripper/clear well) performed within acceptable operating ranges for this reporting period, as indicated by the following:

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- The air stripper VOC removal efficiencies were greater than 99.9 percent.
- The air stripper effluent water discharges complied with applicable SCGs (**Table 4**). Additional details regarding system water monitoring are discussed in Section 4.
- The air treatment components of the OU2 ONCT system (RVPGAC/solvent recovery) performed within acceptable operating ranges during this reporting period. The RVPGAC stack discharges complied with applicable SCGs and discharge limits (**Tables 5A, 5B, 6A, and 6B**).
- Additional maintenance and assessment of the OU2 ONCT system's critical alarms and SCADA system functionality and set points was conducted during the reporting period and continued through March 2019. This effort was conducted to ensure that the alarms were functioning properly, would shut down the treatment systems in the event of an alarm condition, and that the set points were properly established in relation to the design criteria and current treatment system operating conditions.

4 MONITORING

This section provides a summary of the monitoring completed during the 2018 reporting period to meet requirements outlined in the OM&M Manual (Arcadis 2016), the associated Updated Groundwater Monitoring Plan (Arcadis 2016a) and the PWSCP (Arcadis G&M, Inc., 2003a). The following subsections also provide summaries of 2018 monitoring data, comparisons of the results with applicable SCGs, and additional data evaluations describing the performance and effectiveness of the ONCT system, including a supplemental modeling assessment conducted to more fully evaluate ONCT system hydraulic effectiveness during 2018. Finally, key findings are presented that support overall conclusions and suggested changes regarding monitoring for the Site.

4.1 Summary of Monitoring Completed

A summary of the monitoring completed in accordance with the above-referenced plans is provided below:

- Quarterly remedial system performance monitoring:
 - Remedial well water quality monitoring was completed to monitor the performance of the system and assess VOC mass removal. A summary of the VOC and 1,4-dioxane results are provided in **Table 4**. The compound 1,4-dioxane was added as an analyte to the sampling program consistent with NYSDEC's conditional approval (NYSDEC 2015b) of the June 2015 Groundwater Monitoring Plan Addendum (Arcadis 2015b). The method of analysis for 1,4-dioxane was changed from USEPA Method 522 to USEPA Method 8270D-SIM (Selective Ion Monitoring) during the Second Quarter 2018 then to USEPA Method 8270D-SIM-CLLE (Continuous-Liquid-Liquid-Extraction) during the Third Quarter 2018. USEPA Method 8270D-SIM-CLLE provides results comparable to USEPA Method 522 (drinking water method), as previously evaluated by Navy, and is consistent with Navy's program for analysis of groundwater from monitoring wells as well as being less susceptible to interferences typical of drinking water methods when analyzing untreated, raw groundwater. 1,4-dioxane results are also summarized in Section 4.2.5.5.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Water quality monitoring of the treatment systems effluent (Towers 96 and 102) was completed to monitor the performance of the water treatment components of the OU2 ONCT system. A summary of the VOC and 1,4-dioxane results is provided in **Table 4**.
- Remedial treatment systems air quality monitoring was completed to monitor the performance of the air treatment components of the OU2 ONCT system. A summary of the results is provided in **Tables 5A and 5B**.
- Remedial system compliance monitoring:
 - Monthly State Pollutant Discharge Elimination System (SPDES) monitoring was completed to verify water discharged to the West Basins (i.e., Outfall 006) and South Basins (i.e., Outfall 005) met permit conditions. Monitoring was performed in accordance with the terms and conditions of Northrop Grumman's SPDES Permit No. NY0096792 and discharge limits per the SPDES permit equivalency; dated October 12, 2017, amended on July 30, 2018 and transmitted by the NYSDEC to Northrop Grumman on August 9, 2018. A summary of the results is provided in **Table 7**. SPDES discharge monitoring data are documented monthly by Northrop Grumman in Discharge Monitoring Reports (DMRs) that are transmitted to the NYSDEC under separate cover. Copies of DMRs completed during this reporting period are provided in **Appendix D**.
 - Quarterly air monitoring and modeling was completed to determine the compliance status of the air discharges from the OU2 ONCT system and a summary of the results is provided in **Tables 5A/ 5B/5C/5D and 6A/6B**, respectively.
- Semi-annual groundwater hydraulic monitoring:
 - Groundwater hydraulic (water-level) monitoring was completed to determine, monitor, and document local and regional groundwater flow patterns resulting from the operation of the OU2 ONCT system, including the vertical and horizontal extent of the cumulative capture zone created by the operation of the OU2 ONCT system.
 - Routine hydraulic monitoring was performed on April 30 to May 1, 2018 (second quarter 2018) and October 9 to October 10, 2018 (fourth quarter 2018). **Tables 8 and 9** provide the water-level measurement data for the second and fourth quarters, respectively. Data for select Navy monitoring wells, as suggested in the 2017 Annual OM&M Report (Arcadis, 2018a), is not included in these Tables as these supplemental data were not available for the synoptic measurement periods identified above.
- Groundwater quality monitoring:
 - Groundwater quality monitoring was completed to confirm the effectiveness of the OU2 ONCT system in removing impacted groundwater and preventing its off-site migration, by monitoring groundwater conditions in areas on and downgradient of the Site. Groundwater quality monitoring was performed quarterly for VOCs at outpost monitoring wells, semi-annually for VOCs and cadmium/chromium at select on-site and off-site wells (second and fourth quarters of 2018), and annually for VOCs at remaining on-site and off-site wells in the groundwater monitoring network (second quarter of 2018). The groundwater quality monitoring performed in 2018 incorporates modifications consistent with the Updated Groundwater Monitoring Plan (GWMP) (Arcadis 2016a). The compound 1,4-dioxane was added as an analyte to the monitoring well sampling

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT OPERABLE UNIT 2

program consistent with NYSDEC's conditional approval (NYSDEC 2015b) of the June 2015 Groundwater Monitoring Plan Addendum (Arcadis 2015b). The method of analysis for 1,4-dioxane was changed from USEPA Method 522 to USEPA Method 8270D SIM CLLE during the Second Quarter 2018 for monitoring wells, with the exception of outpost wells which continue to be analyzed by USEPA Method 522 (see Section 4.2.5.2). As mentioned previously, USEPA Method 8270D SIM CLLE provides results comparable to USEPA Method 522, as previously evaluated by Navy, and is consistent with Navy's program for analysis of groundwater from monitoring wells as well as being less susceptible to interferences typical for drinking water methods when analyzing untreated, raw groundwater. Groundwater quality results are provided in **Tables 10 through 16**. Groundwater quality results associated with the first, second, and third quarters of 2018 have been previously submitted to NYSDEC in quarterly reports and are also included in this report, for completeness. Consistent with reporting during previous Annual Groundwater Monitoring Reports, copies of the completed Groundwater Sampling Logs and Chain of Custody Records are provided in **Appendix E**. Additionally, supplemental monitoring on a quarterly frequency of monitoring wells GM-21D2, GM-20D, GM-33D2 and GM-75D2 was performed in 2018 to confirm the results of the modeling assessment conducted as part of the 2017 Annual OM&M Report (Arcadis, 2018a). The supplemental monitoring results have been reported in quarterly Administrative Order on Consent Progress reports and are not included herein; however, these supplemental data are incorporated into the overall evaluation of groundwater quality as part of TVOC concentration trends discussed in Section 4.2.5.

4.2 Summary of Monitoring Results

Results of monitoring completed during the reporting period are discussed in the following subsections and the data was and continues to be submitted to the NYSDEC on a quarterly basis, in electronic data deliverable (EDD) format that complies with NYSDEC requirements in the May 2010 DER-10, Section 1.15(a)2 (Electronic Submissions).

4.2.1 Remedial System Performance Monitoring

The OU2 ONCT system remedial well influent concentrations, VOC mass recovered, and VOC mass removal rates (**Tables 3, 4, and 13** and **Figures 4, 5, 6, 7 and 8**) are summarized below:

- Total volatile organic compound (TVOC) influent concentrations to the remedial wells ranged from 59 micrograms per liter ($\mu\text{g/L}$) (Remedial Well 18) to 660 $\mu\text{g/L}$ (Remedial Well 1) (**Table 4**). TCE, and PCE were the VOCs detected at the highest concentrations in all remedial wells, except for Well 19 where concentrations of TCE, and cis-1,2-Dichlorothene (cis-1,2-DCE) were the highest detected. With the exception of Remedial Wells 1 and 3/3R that have been decreasing since 2016, the remedial wells have exhibited stable to decreasing TVOC trends since mid-2006 (**Figures 7 and 8**). Historical TVOC concentrations for Well 3 are shown on Figure 7 to depict historical TVOC trends related to Well 3R, which replaced Well 3 in 2013.
- Vinyl Chloride Monomer (VCM) was detected in Remedial Well 3R but was not detected in the other remedial wells (**Table 4**). OXY is conducting remediation of groundwater (i.e., biosparge system) to address VCM upgradient (northwest) of Remedial Well 3R under the United States Environmental Protection Agency (USEPA) oversight.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Approximately 4,000 lbs of TVOCs were removed from the aquifer and treated by the OU2 ONCT system (**Table 3** and **Figures 4, 5 and 6**). The majority of VOC mass was recovered by Remedial Well 1 (49 percent) and Remedial Well 3R (24 percent). The VOC mass removed in 2018, 3,868 lbs, was less than the mass removed in 2017, 4,979 lbs, due to increased downtime and modified system operation associated with the Tower 96 supplemental blower failure as well as the continued downward trends in VOC influent concentrations.
- Since full-time startup of the ONCT system in November 1998, approximately 208,000 lbs of VOCs have been removed from the aquifer and treated by the ONCT system (**Table 3**).

4.2.2 Remedial System Compliance Monitoring

4.2.2.1 Water Discharge

The OU2 ONCT system's treated groundwater effluent met SPDES permit limits during the reporting period (**Table 7** and **Appendix D**), as indicated by the following:

- The measured concentration of individual VOCs in the treated water effluent were below applicable discharge limits.
- The measured concentrations of nitrogen and pH in the treated water effluent were within applicable discharge limits or ranges.

4.2.2.2 Air Discharge

Influent concentrations for the annual period were compared with the degree of treatment required pursuant to 6NYCRR III A Part 212-2.3(b):

- As shown on **Table 5A**, concentrations of most compounds detected in Tower 96 Influent were less than 6,239 µg/m³ (concentration equivalent to 0.1 pounds per hour at a flow rate of 4,250 cubic feet per minute). For those compounds, air dispersion modeling is necessary to demonstrate that the maximum off-site air concentration is less than the NYSDEC DAR-1 annual guideline concentrations (AGC/SGC) values issued August 10, 2016. TCE, an A-rated compound, was detected at concentrations greater than 13,000 µg/m³ (0.24 pounds per hour) throughout the reporting period and requires 90% removal. Based on the influent and effluent TCE concentrations, the treatment system achieved TCE removal rates greater than 90% and up to 99%.
- As shown on **Table 5B**, concentrations of most compounds detected in Tower 102 Influent were less than 3,402 µg/m³ (concentration equivalent to 0.1 pounds per hour at a flow rate of 7,794 cubic feet per minute). For those compounds, air dispersion modeling is necessary to demonstrate that the maximum off-site air concentration is less than the NYSDEC DAR-1 AGC/SGC values issued August 10, 2016. TCE, an A-rated compound, was detected at concentrations greater than 3,402 µg/m³, 3,480 µg/m³ during the third quarter, (0.1 pounds per hour) and requires 90% removal. Based on the influent and effluent TCE concentrations, the treatment system achieved TCE removal rates greater than 99%.
- As shown on **Table 5C/5B** the maximum discharge amount of the A-rated compound Trichloroethene (500 pounds per year) was not exceeded during this period at Tower 96 or Tower 102, respectively.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

The U.S. Environmental Protection Agency (USEPA) air quality dispersion model AERMOD was executed to estimate the highest ambient air concentrations of the compounds on **Tables 5A/5B**. AERMOD is the USEPA's recommended best state-of-the-art practice Gaussian plume dispersion model. Gaussian models are the most widely used techniques for estimating the impact of non-reactive pollutants, per Appendix W of Title 40 Code of Federal Regulations (CFR) 51 – Guideline of Air Quality Models.

The following parameters were used for the AERMOD model analysis:

- Urban dispersion coefficients
- AERMAP base and terrain elevations, processed using National Elevation Dataset (NED) digitized terrain data
- Surface and upper air observations measured at the Nation Weather Service stations located at Farmingdale and Brookhaven airports for calendar years 2011-2015, in accordance with NYSDEC's DAR-10 Air Dispersion Modeling Guidance Document. This longer period of time was reviewed for the model run, to provide a conservative estimate of atmospheric impacts on the off-site concentrations.
- Receptor grids, per the following methodology:
 - For Tower 96 and Tower 102 receptors were located along the property boundary at distances not exceeding 25 meters between receptors.
 - For Tower 96, 1.5 km x 1.5 km Cartesian grid receptors with distances of 50 meters between the receptors and 3.0 km x 3.0 km Cartesian grid receptors with distances of 100 meters between the receptors.
 - For Tower 102, discrete receptors were located off-site at distances not exceeding 50 meters up to 500 meters from the plant boundary with additional off-site receptors placed at greater distances beyond 500 meters and discrete receptor spacing around the points of maximum predicted impacts did not exceed 50 meters.
- For Tower 96 and Tower 102 emission rates: 1 gram per second (g/s)

Table 6A provides the compound specific scaled hourly ambient air impact and the scaled annual ambient air impact for the fourth quarter sampling event. As shown here for fourth quarter and previously in the first through third quarter reports for 2018 (Arcadis 2018b; Arcadis 2018c; Arcadis 2018d), the scaled ambient air impacts for Tower 96 are below the corresponding SGCs and AGCs.

Table 6B provides the compound specific scaled hourly ambient air impact and the scaled annual ambient air impact for the fourth quarter sampling event. As shown here for fourth quarter and previously in the first through third quarter reports for 2018 (Arcadis 2018b; Arcadis 2018c; Arcadis 2018d), the scaled ambient air impacts for Tower 102 are below the corresponding SGCs and AGCs.

4.2.3 Hydraulic Monitoring and Groundwater Flow

In general, “mounding”, as a result of the discharge of treated water to on-site recharge basins, is expected to be evident in the Shallow/Intermediate zones of the aquifer. Remedial well pumping

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

generates “a cumulative cone of depression” (area of lowered water levels), which is expected to be most clearly evident in the Deep2 zone where the remedial wells are screened. Groundwater flow in the vicinity of the OU2 ONCT system is expected to be generally vertically downward from the shallower portions of the aquifer to the deeper portions of the aquifer. In general, these expectations are being realized as documented in previous annual reports and as further discussed below for 2018.

Hydraulic monitoring was performed on April 30 to May 1, 2018 (second quarter 2018) and October 9 to October 10, 2018 (fourth quarter 2018); **Tables 8 and 9** provide the water-level measurement data, respectively. **Table 17** summarizes vertical hydraulic gradients for key monitoring well pairs in the vicinity of the OU2 ONCT system (which were calculated using the October 2018 water-level measurements) and compares these gradients to groundwater model-predicted gradients (both direction and magnitude).

Figures 9 and 10 depict groundwater elevations and flow directions in the Shallow/Intermediate zone and Deep2 (D2) zone, respectively, during operation of the OU2 ONCT system in October 2018. As identified in previous annual reports, the hydrogeologic zones are based on the layering in the regional groundwater flow model. It should be noted that the assignment of monitoring wells to the various hydrogeologic zones of the aquifer system, as referenced in this report and identified on various tables, including **Tables 8 and 9**, has been modified to be consistent with updates to the vertical discretization (layering), of the regional groundwater flow model. The layering of the regional groundwater flow model was updated to reflect changes in the understanding of aquifer geometry based on recent data collected as part of investigations by Navy and Northrop Grumman.

Figure 9 shows that mounding of the water table exists in the Shallow/Intermediate zone, extending beneath the South Basins and across the former Northrop Grumman site southern boundary. Data summarized in **Table 17** indicate vertical hydraulic gradients are consistent with the expectations of vertical groundwater flow stated above. Additionally, the vertical gradients generally agree with the model-predicted gradients, which are predominantly downward with the one exception at well pair GM-74D2/74D3 where the field observed gradients are upward. At this location, the model-predicted gradient is also upward, reflecting the localized influence of remedial well pumping in the Deep2 zone. Mounding and downward vertical gradients force shallower groundwater vertically downward into the Deep2 zone, where it is extracted by the ONCT remedial wells. **Figure 10** shows that the ONCT remedial wells have developed a cumulative zone of capture in the Deep2 zone that extends downgradient of the Site (see groundwater divide depicted on **Figure 10**), in the vicinity of Central Avenue.

As previously noted in Section 3.2 Remedial Well 19 and the South Basins were operating consistently below design flow rates (**Table 3**). The groundwater flow and solute transport model was used to confirm the effectiveness of the ONCT system, under these atypical conditions, in meeting its objective of on-site containment of VOC-impacted groundwater. In summary, the modeling effort considered the variability in remedial well flow rates and basin discharge rates over 2018 to determine the effects these changes in groundwater flow and recharge would have on the on-site portion of VOC-impacted groundwater. This was accomplished by transient flow and solute transport modeling. At the end of 2018, the simulated steady-state capture zone was superimposed on the transient flow solute transport modeling results to assess if on-site containment was maintained. **Figure 17** shows these results for several key model layers that are representative of overall conditions throughout the aquifer. As shown on this figure, the

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT OPERABLE UNIT 2

capture zone in each layer encompasses the on-site VOC-impacts. The modeling assessment indicates the ONCT system maintained vertical and horizontal control of VOC-impacted groundwater during 2018 and is preventing its off-site migration through hydraulic containment. More detailed information on this modeling assessment and a complete presentation of results is provided in **Appendix C**.

In summary, available 2018 hydraulic monitoring data indicate that the mounding, predominantly downward vertical gradients, and the Deep2 capture zone resulting from the operation of the OU2 ONCT system creates a hydraulic barrier that prevents the off-site movement of VOC-impacted groundwater. The modeling assessment further supports this finding.

4.2.4 ONCT Hydraulic Effectiveness Program

Consistent with the OU2 ROD, Northrop Grumman conducted work in 2012 (Phase 1) and 2013 (Phase 2) under the “ONCT Hydraulic Effectiveness Program” to provide supplemental data to further evaluate and confirm that the ONCT system is performing effectively. The technical memorandum associated with Northrop Grumman’s On-Site Hydraulic Effectiveness Program was provided in **Appendix F** of the 2014 Periodic Review Report (Arcadis 2014c). This memorandum included a summary of the work performed, summary of the additional data (geologic, hydrogeologic, and groundwater quality) collected, and an interpretation regarding the effectiveness of the OU2 ONCT system in meeting its remedial objective (i.e., on-site containment of VOC-impacted groundwater). Interpretive figures were developed and included in the technical memorandum to support data evaluation and included profile-view figures in the vertical plane along the former Northrop Grumman site southern boundary that provided interpretations of: 1) TVOCs in groundwater, 2) groundwater flow, and 3) the geologic framework. Plan-view figures were included in the technical memorandum and provided interpretations of TVOCs in the Deep, Deep2 and Deep3 zones. In subsequent annual reports (e.g., covering calendar years 2016 and 2017), the plan and profile view figures (both perpendicular and parallel to groundwater flow) were updated with annual data collected by Northrop Grumman and supplemented with other data collected by Navy and Bethpage Water District during the annual time period to continue to evaluate and confirm that the ONCT system is performing effectively.

For this report, Arcadis has incorporated an updated assessment of the three-dimensional distribution of TVOC concentrations in the upper glacial and Magothy aquifers. This assessment involved three-dimensional analysis (Earth Volumetric Studio [EVS]) of the most recently available data collected between 2008 and 2018 from each sampling location, including data provided in this report for monitoring and extraction wells, and data from other monitoring wells, vertical profile borings, extraction wells and public water supply wells. The resulting three-dimensional representation of TVOC concentrations reflects the sum of the 14 site-related VOCs identified in the Public Water Supply Contingency Plan (PWSCP; Arcadis G&M, Inc., 2003a) along with seven additional VOCs for a more conservative representation (1,2-dichloropropane, dichlorofluoromethane, dichlorodifluoromethane, benzene, toluene, total xylenes and vinyl chloride). **Figure 11** shows locations of cross-sections superimposed on the overall TVOC distribution (maximum concentrations). **Figure 12** provide interpretations of: 1) TVOCs in groundwater, and 2) the overall geologic framework (top of the Raritan confining unit representing the bottom of the Magothy aquifer) in the vertical plane along the former Northrop Grumman site southern boundary, perpendicular to the regional ambient groundwater flow direction. **Figure 13** provides an interpretation of

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

TVOCs in groundwater and the overall geologic framework (top of the Raritan Unit) in the vertical plane oriented northwest-southeast from on-site to off-site, parallel to the regional ambient groundwater flow direction. Plan-view **Figures 14, 15 and 16** provide interpretations of maximum TVOCs in the Deep, Deep2 and Deep3 zones, respectively. Supplemental groundwater quality data from associated Navy wells for 2018 were not available for the assessment.

Key findings and conclusions from review of these updated interpretive figures are summarized below:

- Based on the west-east profile-view oriented along the former Northrop Grumman site southern boundary (**Figure 12**), down to a depth below land surface of approximately 400 feet TVOCs were less than 5 µg/L.
- The deepest portion of the aquifer (basal Magothy) did not exhibit TVOC concentrations in excess of 5 µg/L.
- North-south profile view **Figure 13** shows groundwater containing TVOCs at concentrations greater than 5 µg/L on-site and further downgradient, separated by a “clean water” front (i.e., TVOCs less than 5 µg/L). Bifurcation of TVOC-impacted groundwater, and the associated “clean water” front will continue to develop downgradient of the ONCT system as on-site containment is maintained and VOC-impacted groundwater continues to be removed from the aquifer by pumping the remedial wells.
- For the Deep zone the bifurcation effect on the TVOC distribution (shown by separate areas of less than 5 µg/L on and off-site) induced by continued pumping of the ONCT remedial wells and recharge of clean water, is depicted on plan-view **Figure 14**. As pumping continues over time, bifurcation of TVOC-impacted groundwater, and the associated “clean water” front will continue to develop downgradient of the ONCT system as on-site containment is maintained and VOC-impacted groundwater continues to be removed from the aquifer by pumping the remedial wells.
- For the Deep2 zone, the bifurcation effect on the TVOC distribution (shown by separate 5 µg/L areas on and off-site) induced by continued pumping of the ONCT remedial wells and recharge of clean water is depicted on plan-view **Figure 15**. As pumping continues over time, bifurcation of TVOC-impacted groundwater, and the associated “clean water” front will continue to develop downgradient of the ONCT system as on-site containment is maintained and VOC-impacted groundwater continues to be removed from the aquifer by pumping the remedial wells.
- For the Deep3 zone, the bifurcation effect on the TVOC distribution (shown by separate 5 µg/L areas on and off-site) induced by continued pumping of the ONCT remedial wells and recharge of clean water is depicted on plan-view **Figure 16**. As pumping continues over time, bifurcation of TVOC-impacted groundwater, and the associated “clean water” front will continue to develop downgradient of the ONCT system as on-site containment is maintained and VOC-impacted groundwater continues to be removed from the aquifer by pumping the remedial wells.

In summary, this enhanced assessment of the three-dimensional distribution of TVOC concentrations confirms that the ONCT system provides effective vertical and horizontal hydraulic control of VOC-impacted groundwater and is preventing its off-site migration.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

4.2.5 Groundwater Quality

This section describes and evaluates the analytical results of groundwater quality monitoring completed during 2018.

4.2.5.1 Volatile Organic Compounds

The evaluation of VOC monitoring results is presented by hydrogeologic zone and considers the following factors: (1) proximity to the hydraulic barrier formed by the OU2 ONCT system and (2) NYSDEC Standard Criteria and Guidance Values (SCGs). As mentioned previously, some well assignments by hydrogeologic zone have been modified in this report as a result of recent updates to the regional groundwater flow model.

As on-site hydraulic containment continues and the off-site migration of VOCs is prevented, on- and off-site groundwater quality is improving over time. In the area immediately south of the hydraulic barrier (i.e., the zone of hydraulic capture formed by the operation of the OU2 ONCT system), a “clean water” front is developing, which is causing bifurcation of the VOC impacts (i.e., development and growth of a zone of groundwater with trace or no detectable VOCs downgradient of the former Northrop Grumman site southern boundary).

As mentioned above, results of the routine annual monitoring round and semi-annual monitoring round (second quarter and fourth quarter of 2018) were used to evaluate VOC groundwater quality for the reporting period. **Tables 10 through 14** summarize concentrations of VOCs during the annual groundwater monitoring round by hydrogeologic zone compared to applicable NYSDEC SCGs. Additionally, time-concentration graphs depicting the long-term VOC concentration trends in key wells (with detectable concentrations of VOCs that were sampled in 2018) grouped by proximity to the hydraulic barrier created by operation of the OU2 ONCT system are shown on **Figures 7, 8 and 18 through 22**.

4.2.5.1.1 Shallow/Intermediate Zones

As shown in **Tables 10 and 11**, shallow/intermediate monitoring wells located near or immediately downgradient of the former Northrop Grumman site southern boundary (GM-20I, GM-21S, GM-21I, GM-74I, GM-78S, GM-78I, and N-10631) did not exhibit exceedances of SCGs for VOCs in 2018. The groundwater quality data confirms that the operation of the OU2 ONCT system has formed an effective hydraulic barrier that prevents the off-site migration of VOC-impacted groundwater in the shallow/intermediate zones of the aquifer.

The majority of shallow/intermediate monitoring wells located on-site and upgradient of the former Northrop Grumman site southern boundary (FW-03, GM-15SR, GM-15I, GM-17I, GM-18I, HN-40S, HN-40I, HN-42S, and HN-42I) did not exhibit VOC exceedances of SCGs in 2018 except for GM-13D and HN-24I. GM-13D exhibited exceedances of SCGS for TCE and PCE. Well GM-13D is located on-site and upgradient of the OU2 ONCT system (Figure 1). This well exhibits an overall downward trend in TVOC concentrations (**Figure 18**), with current concentrations representing a reduction in VOC concentrations of greater than 97 percent since the beginning of record (approximately one year after ONCT system

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

startup). Additionally, upgradient well HN-24I shows an overall decreasing TVOC concentration trend since startup of the OU2 ONCT system (**Figure 18**). Also, HN-24I exhibited exceedances of SCGs for TCE and PCE. These two wells (GM-13D and HN-24I) are located within the capture zone of the ONCT system; therefore, groundwater in this area is hydraulically contained and, over time, will be extracted and treated.

4.2.5.1.2 Deep and Deep2 Zones

2018 groundwater quality data indicate VOC SCG exceedances exist both on-site and in wells located further downgradient of the hydraulic barrier in the off-site portion of the VOC- impacted groundwater not actively remediated. However, an overall downward trend in VOC concentrations over time exists in Deep/Deep2 zone wells upgradient of the OU2 ONCT system and in off-site areas, further downgradient of the Site (more recent exceptions to this overall, historic trend are noted below, e.g., GM-79D, GM-37D, and GM-21D2). Data summarized in **Tables 12 and 13**, as well as VOC trend graphs depicted on **Figures 7, 8, 19, 20 and 21** support these findings as follows:

- Deep zone monitoring wells located on-site along or upgradient of the former Northrop Grumman site southern boundary (e.g., GM-15D, GM-17D, GM-18D, GM-74D, and GM-39DA) and Deep zone monitoring wells located immediately downgradient of the former Northrop Grumman site southern boundary (e.g., Wells N-10627, GM-20D, and GM-21D) exhibited no SCG exceedances for VOCs during 2018. Monitoring well GM-79D, also located immediately downgradient and southeast of the former Northrop Grumman site in the Deep zone, exhibited SCG exceedances of TCE; however, the long-term trend in VOC concentrations remains downward in this well however, the last two years show a slight increasing trend (**Figure 19**). Monitoring well GM-34D located south of the site also exhibited SCG exceedances of cis1,2-dichloroethene, TCE and PCE for the fourth quarter 2018; however, the long term trend in VOC concentrations remain downward in this well (figure 21). Monitoring well GM-37D, located east of monitoring well GM-79D, also exhibited an SCG exceedance of TCE for the fourth quarter 2018 and an increase in concentration similar to levels detected prior to 2004 (**Figure 19**). The recent increase in these two monitoring wells to the southeast/east of the former Northrop Grumman site may be indicative of groundwater impacts not related to Operable Unit 2.
- **Figure 7** depicts TVOC concentration trends for Deep2 zone wells along the southern and southwestern boundary of the former Northrop Grumman site. While exceedances of SCGs during 2018 are noted for monitoring wells GM-33D2 (TCE and Freon 113) and GM-73D2 (TCE) (**Table 13**), the overall long-term trends for these wells are downward with stable trends since approximately 2009 (**Figure 7**). Current concentrations in Wells GM-33D2 and GM-73D2 represent an approximate reduction in VOC concentrations of greater than 99 percent since 1999, and 97 percent since 2000, respectively.
- **Figure 8** depicts TVOC concentration trends for Deep and Deep2 zone wells along the southern and southeastern former Northrop Grumman site boundaries. While exceedances of SCGs during 2018 are noted for some of these Deep2 zone monitoring wells (**Table 13**), continued long-term trends are declining to relatively stable for these wells.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- **Figure 8** depicts TVOC concentration trends for Deep2 monitoring well GM-21D2, which is located just south of the former Northrop Grumman site southern boundary. GM-21D2 exhibited a declining to stable trend throughout 2018 as shown on **Figure 8**. Supplemental quarterly monitoring of GM-21D2, GM-20D, GM-32D2 and GM-75D2 continued to be conducted in 2018 to assess if TVOC trends remained stable following the period of reduced remedial well flow rates in 2017 due to required basin maintenance in 2017. **Figure 7** indicates that GM-33D2 continued to exhibit a decreasing to a stable TVOC concentration trend. Figure 8 indicates that GM-20D and GM-21D2 continued to exhibit a decreasing to stable TVOC concentration trends for the majority of 2018. **Figure 21** indicates that GM-75D2 continued to exhibit a decreasing to stable TVOC concentration trend in 2018. Generally, significant, sustained deviations from recent trends were not observed in 2018 indicating that the reduced remedial well flow rates in 2017 did not result in loss of capture of site VOC-impacted groundwater.
- **Figures 20 and 21** depict TVOC concentrations trends for Deep and Deep2 zone wells further downgradient of the Site to the southeast and to the south, respectively, in off-site areas of VOC-impacted groundwater that are not actively remediated. While exceedances of SCGs during 2018 are noted for some of these Deep and Deep2 zone monitoring wells (**Tables 12 and 13**), these wells continue to exhibit decreasing to stable TVOC concentration trends.
- **Figure 22** depicts TVOC trends for Deep and Deep2 zone wells in the GM38 Area, located further downgradient and southeast of the Site. OM&M reports for the GM-38 Area Remedy are submitted to NYSDEC by the Navy under separate cover. The TVOC concentrations in the off-site wells GM-38D and GM-38D2 have decreased since mid-2006 and 2002, respectively, except for an increase in TVOCs that was observed in GM-38D2 since late 2015. This increase occurred after Navy shut-down GM-38 system's Remedial Well RW-3 on July 1, 2015 and increased the Remedial Well RW-1 pumping rate from 800 gpm to 1000 gpm (H&S Environmental, 2016). Most recently through 2018, the concentrations appear to be stabilizing. In 2018, the recovery well flowrates were adjusted to approximately 800 gpm for RW-1 and 200 gpm for RW-3 during the first quarter of 2018 and were maintained at those rates through at least the third quarter of 2018 (H&S Environmental, 2018).

In summary, the groundwater quality data from the Deep and Deep2 zone wells continues to support the interpretation of the hydraulic data and confirm that the operation of the OU2 ONCT system has formed an effective hydraulic barrier that prevents the off-site migration of VOC-impacted groundwater in the Deep and Deep2 zones and that groundwater quality off-site in these zones of the aquifer is improving over time. VOC-impacted groundwater exceeding SCGs in on-site/upgradient wells is hydraulically contained and over time will be extracted and treated by the OU2 ONCT system

4.2.5.2 Outpost Well Monitoring

Starting in the fourth quarter 2015 outpost wells were repurposed as plume monitoring wells and also the method of analysis for VOCs was changed. The fourth quarter of 2015 represents the first event reflecting the change to semi-annual frequency and a change in the analytical method to USEPA Method 8260C for Target Compound List (TCL) VOCs. Starting second quarter 2016 samples from these outpost wells were analyzed for VOCs using USEPA Method 524.2 and for 1,4-dioxane using USEPA Method 522 as per email request from Navy dated May 2, 2016. The results of the second and fourth quarter 2018 outpost

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

well monitoring rounds, relative to applicable SCGs, are provided in **Table 14** for TCL VOCs. **Figures 23 through 26** are trend graphs for outpost wells through their period of record.

The complete descriptions of the procedures followed to collect groundwater samples from the outpost wells and to evaluate and document the results are provided in the PWSCP (ARCADIS G&M, Inc. 2003). Originally, there were a total of nine outpost monitoring wells (BPOW1-1, BPOW1-2, BPOW1-3, BPOW2-1, BPOW2-2, BPOW3-1, BPOW3-2, BPOW4-1, and BPOW4-2) with trigger values established for seven of the wells in accordance with the PWSCP. Currently there are a total of 15 outpost wells, and the six newest outpost monitoring wells (BPOW1-4, BPOW1-5, BPOW1-6, BPOW2-3, BPOW3-3, and BPOW3-4) did not have trigger values established. Outpost wells BPOW4-1 and BPOW4-2 were abandoned by the Navy in 2014 and replaced during the fourth quarter of 2014 with wells BPOW4-1R and BPOW4-2R at slightly different locations than the original wells but at similar depths. Sampling of these replacement wells as part of the outpost well groundwater monitoring program was initiated in 2015.

Because trigger value exceedances have already been reported according to the PWSCP and as well head treatment has been installed at all four well fields monitored by the outpost wells, the original outpost wells have met the goal of the PWSCP (ARCADIS G&M, Inc. 2003) and they, along with the six new outpost wells, were re-purposed for use as plume monitoring wells, upon NYSDEC's conditional approval on August 25, 2015 of the June 2015 Groundwater Monitoring Plan Addendum (Arcadis 2015b). These outpost wells now provide data to evaluate trends in VOCs upgradient of the public water supply wells. Therefore, TVOC trigger values that had been previously established are no longer shown in **Table 14** and on **Figures 23 through 26**.

Results for the year 2018 are compared to applicable SCGs as discussed below:

- VOCs were only detected above SCGs for VOCs in outpost wells BPOW 3-4, BPOW 4-1R, and BPOW 4-2R. **Figures 23, 24, 25 and 26** show TVOC trend graphs for the 15 outpost wells. Long term decreasing to stable trends are shown for outpost wells BPOW1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 2-1, 2-2, 2-3, 3-1, 3-2, and 3-3. Long term increasing trends are shown for outpost wells BPOW3-4, BPOW4-1R, and BPOW 4-2R.

4.2.5.3 Cadmium and Chromium

Cadmium and chromium analytical results for the second quarter and fourth quarter of 2018 are provided in **Table 15**. Trends in total cadmium concentrations near former Northrop Grumman Plant 2 are shown on **Figure 27**. Trends in total chromium concentrations near former Northrop Grumman Plants 2 and 1 are shown on **Figures 28 and 29**, respectively. Results are summarized as follows:

- Exceedances of the SCG for cadmium were not detected in off-site monitoring wells GM-78S and GM-78I; however, an exceedance of the SCG was noted in the 2018 fourth quarter for on-site monitoring well N-10631 and was similar to concentrations detected in 2016 as shown on **Figure 27**.
- Total (unfiltered) chromium did not exceed the SCG near the former Northrop Grumman Plant 2 in 2018 (**Figure 28**), with the exception of monitoring well MW-02GF. Monitoring Wells GM-78S, GM-

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

78I, and N-10631 continued to exhibit consistent decreasing or stable trends (**Figure 28**). Monitoring Well MW-02GF has shown variable concentrations for the period of record, including some results above the SCG, prior to 2013, concentrations below the SCG from 2013 through 2017, and most recently increasing to concentrations above the SCG in 2018.

- Since late 2010, the total (unfiltered) chromium concentration trends in PLT1MW-06, PLT1MW-05 and GM-15SR near the former Northrop Grumman Plant 1 have generally been stable (**Figure 29**). Apparent increases in total chromium concentration in 2018 (PLT1MW-05) or decreases in total chromium concentration in 2018 (GM-15SR) compared to 2017 are generally within the variability of concentrations observed over this period. These three monitoring wells continue to exhibit total chromium concentrations in excess of the SCG in 2018. There have been no detections of total chromium in Well PLT1MW-04 since mid-2005 (**Figure 29**).

4.2.5.4 Tentatively Identified Compounds

Consistent with reporting during previous Annual Groundwater Monitoring Reports, this section summarizes Tentatively Identified Compounds (TICs). Two unknown TICs were detected in former outpost wells BPOW1-1 and BPOW1-2 and monitoring wells GM-15I and GM-15SR in the second quarter of 2018. Two unknown TICs were detected in former outpost well BPOW2-2 in the third quarter of 2018. TICs were not detected in any other monitoring wells or remedial wells during 2018.

4.2.5.5 1,4-Dioxane

As per the NYSDEC's conditional approval of the June 2015 Groundwater Monitoring Plan Addendum (NYSDEC 2015b), 1,4-dioxane was added as an analyte for all wells sampled under the OU2 groundwater monitoring program. Samples were analyzed for 1,4-dioxane using USEPA Method 522 in the first quarter of 2018 and then were analyzed using USEPA Method 8270D SIM CLLE beginning second quarter of 2018 for monitoring wells; samples collected from outpost wells continue to be analyzed using USEPA Method 522 (see Section 4.2.5.2). The results of 1,4-dioxane analysis of groundwater samples obtained from all four quarters of sampling in 2018 are provided in **Table 16**.

Out of a total of 151 samples collected in 2018 from former outpost wells, monitoring wells, and remedial wells including replicates, 18 samples were non-detect. Detected concentrations ranged from 0.114 µg/L to 38 µg/L. Table 16 also provides a further breakdown of well sampling results by hydrogeologic zone.

4.2.5.6 Vinyl Chloride Monomer

As mentioned previously, vinyl chloride monomer (VCM) was detected in Northrop Grumman Remedial Well 3R during the reporting period but was not detected in the other remedial wells. With respect to monitoring wells sampled during the reporting period, VCM continues to be detected in only one monitoring well, MW-3-1 (located adjacent to Remedial Well 3R), at a concentration of 36.0 µg/L during the second quarter and 16.8 µg/L in the fourth quarter of 2018. Groundwater remediation (i.e., biosparging system) to address VCM upgradient (northwest) of Remedial Well 3R and Monitoring Well MW-3-1 is currently underway by OXY under USEPA oversight.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

4.2.5.7 QA/QC Samples and Data Validation

The results of analysis of QA/QC (field blank and trip blank) samples from the year 2018 is provided in **Table 18A** and **Table 18B**.

ARCADIS performed validation of treatment system vapor and water samples, and groundwater quality data in accordance with the Updated GWMP (Arcadis 2016c) and by following the contract laboratory program and by applying relevant NYSDEC and USEPA protocols. The quality of the data is considered acceptable with the qualifiers indicated on **Tables 4, 5A/B, 7 and 10 through 16**.

5 CONCLUSIONS

The following conclusions are provided regarding the performance and ability of the OU2 ONCT system, to achieve the RAOs for the Site for the 2018 reporting period:

- The ONCT system is operating as designed and hydraulic containment of the on-site portion of the VOC-impacted groundwater continues.
- The water quality data from wells immediately downgradient of the hydraulic barrier have demonstrated downward trends over time.
- Groundwater quality data indicates that bifurcation of the VOC plume is continuing in the Deep, Deep2, and Deep3 zones south of the hydraulic barrier.
- Based on remedial well and system performance monitoring during the reporting period, the OU2 ONCT groundwater extraction and treatment system operated as designed and extracted on-site contaminated groundwater and prevented it from migrating off-site. A supplemental modeling assessment confirmed that the OU2 ONCT system maintained capture of VOC-impacted groundwater during 2018 when Remedial Well 19 and the South Basins were operating at reduced flow rates and recharge rates, respectively.
- The operation of the ONCT system complied with applicable NYSDEC SCGs for OU2 ONCT system emissions (i.e., treated water and air emissions).
- Cadmium and chromium impacts to groundwater from Plant 2 remain limited to on-site.
- Since late 2010, the chromium concentration trends in PLT1MW-06, PLTMW-05 and GM-15SR near the former Northrop Grumman Plant 1 have been stable.
- In 2018, chromium concentrations in MW-02GF (near Plant 2) increased to levels above the SCG and were above the highest historical concentrations.

6 SUGGESTIONS FOR CONTINUED MONITORING

Based on the findings and conclusions made in this report, the following suggestions are provided with respect to continued monitoring for ONCT system effectiveness:

- Supplemental quarterly monitoring of monitoring wells GM-21D2, GM-20D, GM-33D2 and GM-75D2, which are located just south of the ONCT remedial wells, should be conducted to continue to confirm

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

the results of the modeling assessments conducted for 2017 and 2018. Although decreases in VOC trends has been continuously observed in 2018 with no sustained deviations, monitoring of GM-21D2 and the other supplemental wells GM-20D, GM-33D2 and GM-75D2 should continue on a quarterly basis in 2019 as basin maintenance activities are expected to continue and be completed in 2019. Once confirmed that the VOC trends in these wells are consistent with the past and there are no significant, sustained deviations, the sampling should return to a semiannual frequency.

- A broader evaluation of concentrations trends was conducted across the program to see if current sampling frequencies remain appropriate for overall monitoring objectives. Trends for all wells sampled as part of the routine OU2 groundwater monitoring program were evaluated, including the trend graphs for key wells discussed in this report (**Figures 7, 8, 18 through 22, and 27 through 29**). Consistent downward trends and minimal variations in concentrations from one sampling event to the next have been observed in monitoring wells GM-13D, HN-24I, GM-15D, GM-15D2, GM-17I, GM-17D, GM-18I, GM-18D, GM-73D3, GM-74D, PLT1MW-04, GM-34D2, GM-35D2, GM-36D, GM-36D2, GM-78D, and GM-78D2. Those wells are proposed to be monitored on a less frequent basis, as specified in **Table 19**. As shown in **Table 19**, the sampling frequency of one monitoring well (MW-2GF) is proposed to be increased. For wells that are not included in the figures referenced above, additional trend graphs are presented in **Appendix F** to support these suggested modifications.
- Continue to enhance hydraulic and groundwater quality monitoring in the vicinity of the ONCT system by incorporating data obtained from Navy for monitoring well clusters RE-123, RE-126, and additionally, RE-109.

2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

7 CERTIFICATION STATEMENT

For each institutional or engineering control identified for the OU2 On-Site Groundwater Remedy, I certify that all of the following statements are true:

- a. The engineering control employed for the OU2 On-Site Groundwater Remedy is unchanged from the date the control was put in place, or last approved by New York State Department of Environmental Conservation Division of Environmental Remediation (DER).
- b. Nothing has occurred that would impair the ability of such control to protect public health and the environment.
- c. Nothing has occurred that would constitute a violation or failure to comply with any operation, maintenance, and monitoring plan for this control.
- d. Access to the OU2 On-Site Groundwater Remedy will continue to be provided to DER to evaluate the remedy, including access to evaluate the continued maintenance of this control.


Christopher Engler, P.E.
Engineer of Record
New York License # 069748



2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

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2018 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

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TABLES



Table 1A
Summary of Weekly Monitoring Data^(1,2) 2018,
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Date	WELL 1				WELL 3R				AIR STRIPPER				
	Extracted Groundwater			VFD	Extracted Groundwater			VFD		Influent Water Flow			Ambient Influent Air Temperature
	Flow Rate (gpm)	Totalizer (x1000) (gal)	Pressure (psig)	Frequency (Hz)	Flow Rate (gpm)	Totalizer (x1000) (gal)	Pressure (psig)	Frequency (Hz)	Amperage (Amps)	Flow Recorder Rate (gpm)	Flow Meter Rate (gpm)	Totalizer (x100) (gal)	(°F)
1/15/2018	808	6,139,588	46	49.08	717.8	536,501	28	43.64	73.7	1,478	1,466	10,633,311	22
2/9/2018	888	6,383,929	44	48.99	720.0	562,250	28	43.82	74.1	1,480	1,475	11,163,333	30
3/16/2018	808	6,789,691	44	48.83	717.1	598,295	29	43.65	73.7	1,486	1,483	11,894,607	40
4/10/2018	806	7,075,964	45	48.73	718.4	623,523	30	43.64	73.6	1,474	1,474	12,390,612	58
5/15/2018	778	7,476,560	45	48.73	718	659,680	30	44.92	76.4	1,580	1,582	13,180,557	60
6/15/2018	779	7,826,724	45	48.73	718	691,854	30	44.93	76.6	1,580	1,582	15,419,015	72
7/11/2018	809	8,124,896	46	49.73	719	718,787	30	45.2	77.1	1,608	1,620	19,529,099	80
8/21/2018	501	8,272,556	31	39.47	509	732,616	26	38.23	62.3	1,000	1,000	NM	63
9/5/2018	806	8,387,422	46	49.62	718	743,483	30	44.78	75.9	1,340	1,522	NM	77
10/9/2018	804	8,779,431	45	49.54	720	778,218	30	45.02	76.4	1,613	1,611	19,940,676	67
11/6/2018	812	9,088,400 ⁽⁴⁾	43	47.39	717	807,266	30	45	76.4	1,555	1,540	22,001,023	58
12/6/2018	706.3	9,360,380 ⁽⁴⁾	40	45.99	718	831,592	28	44.67	75.7	1,491	1,479	26,164,055	40

Notes and Abbreviations on last page.

Table 1A
Summary of Weekly Monitoring Data^(1,2) 2018,
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Date	HEAT EXCHANGER		PROCESS BLOWER					CONDENSER		
								Condenser Cooling Water		
	Air Inlet Pressure (iwc)	Steam Inlet Pressure (psig)	Air Inlet Pressure (iwc)	Air Effluent Temperature (°F)	Air Effluent Pressure (iwc)	Blower Static Pressure (iwc)	Influent Temperature (°F)	Effluent Temperature (°F)	Temperature Differential (°F)	
1/15/2018	-4.2	14	-4.9	90	4.7	9.6	54	80	26	
2/9/2018	-4.0	14	-4.8	92	4.8	9.6	50	80	30	
3/16/2018	-4.0	14	-4.6	90	4.7	9.3	55	80	25	
4/10/2018	-4.0	16	-4.8	90	2.1	6.9	58	77	19	
5/15/2018	-4.0	15	-4.8	90	2.1	6.9	56	85	29	
6/15/2018	-6.0	15	-4.0	100	5.0	9.0	54	80	26	
7/11/2018	-6.0	15	-4.2	100	1.5	5.7	57	85	28	
8/21/2018	-1.3	16	-4.0	100	3.0	7.0	55	85	30	
9/5/2018	-4.0	14	-4.4	100	1.5	5.9	55	82	27	
10/9/2018	-4.8	17	-4.7	93	1.8	6.5	56	NM	NC	
11/6/2018	-5.0	17	-4.0	92	1.6	5.6	56	NM	NC	
12/6/2018	-3.5	15	-4.9	90	2.0	6.9	54	80	26	

Notes and Abbreviations on last page.

Table 1A
Summary of Weekly Monitoring Data^(1,2) 2018,
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Date	SEPARATOR		AIR COMPRESSOR	SUPPLEMENTAL AIR TREATMENT SYSTEM		WEST RECHARGE BASINS				
	Condensed Steam Water			Influent Blower	Total System Effluent	North		South		
	Separator Temperature (°F)	Separator Vent Temperature (°F)		Delivery Pressure (psig)	Pressure (iwc)	Basin Water Height (ft)	Status (On/Off)	Basin Water Height (ft)	Status (On/Off)	
1/15/2018	78	100	89	-1.5	5.0	6.5	On	10.0	On	
2/9/2018	74	100	89	-1.2	4.5	8.3	On	11.8	On	
3/16/2018	82	110	115	-1.2	4.3	13.2	On	2.0	Off	
4/10/2018	NM	NM	86	-2.5	5.0	13.0	On	0.0	Off	
5/15/2018	83	97	86	-2.5	5.0	13.6	On	0.0	Off	
6/15/2018	76	100	89	-2.0	4.0	13.4	On	0.0	Off	
7/11/2018	86	110	115	-2.0	5.0	13.4	On	0.0	Off	
8/21/2018	88	115	98	-1.6	4.5	8.7	On	6.1	On	
9/5/2018	89	115	107	-2.5	5.0	9.7	On	6.8	On	
10/9/2018	90	96	86	-2.5	5.0	8.8	On	3.2	On	
11/6/2018	90	95	86	-2.5	5.0	9.9	On	3.8	On	
12/6/2018	82	100	80	-1.0	5.2	10.4	On	4.5	On	

Notes and Abbreviations on last page.

Table 1A
Summary of Weekly Monitoring Data^(1,2) 2018,
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Date	REGENERATIVE VAPOR PHASE TREATMENT UNITS									
	Adsorb				Desorb					
	Flow (cfm)	Pressure (iwc)	Temperature (°F)	Flow (scfm)	Desorb Bed (A/B)	Time into cycle (min)	Influent Steam Temperature ⁽³⁾ (°F)	Influent Steam Pressure (psig)	Effluent Steam Temperature (°F)	Effluent Temperature (°F)
1/15/2018	4,880	1.10	85	4,758	B	53	239	14	159	85
2/9/2018	4,820	1.20	90	4,658	B	50	235	16	74	90
3/16/2018	4,900	1.18	90	4,735	A	40	239	12	140	96
4/10/2018	4,670	NM	98	NC	B	49	238	16	195	90
5/15/2018	4,600	NM	NM	NC	B	38	231	15	231	90
6/15/2018	4,590	0.28	100	4,347	A	70	181	15	181	95
7/11/2018	4,600	0.46	98	4,374	A	73	139	14	139	80
8/21/2018	3,050	1.35	83.5	2,984	B	38	205	15	205	90
9/5/2018	4,770	1.28	98	4,631	A	70	183	12	183	100
10/9/2018	4,910	0.80	87	4,742	A	78	205	22	205	90
11/6/2018	4,850	0.35	88	4,697	B	29	219	17	219	88
12/6/2018	4,880	1.34	80	4,740	A	58	176	15	176	90

Notes and Abbreviations on last page.

Table 1A
Summary of Weekly Monitoring Data^(1,2) 2018,
Tower 96 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Operational data collected weekly by Northrop Grumman and supplemented by monthly Arcadis measurements. For clarity, data shown is representative of monthly conditions taken from a single weekly site visit or monthly Arcadis visit.
- (2) Instantaneous values from field-mounted instruments, except otherwise noted.
- (3) Measurement taken with Infrared temperature gun.
- (4) Well 1 Totalizer reading is taken from SCADA, due to typographical errors during the weekly monitoring events.

°F	degrees Fahrenheit
Amps	amperes
cfm	cubic feet per minute
ft	feet
gal	gallons
gpm	gallons per minute
Hz	hertz
iwc	inches of water column
min	minutes
psig	pounds per square inch, gauge
scfm	standard cubic feet per minute
NA	Not Available
NC	Not Calculated
NM	Not Measured
RVPGAC	Regenerative Vapor Phase Granular Activated Carbon
SCADA	Supervisory Control and Data Acquisition
VFD	Variable Frequency Drive

Table 1B
 Summary of Weekly Monitoring Data^(1,2) 2018
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Date	WELL 17					WELL 18					WELL 19				
	Extracted Groundwater			VFD	Extracted Groundwater			VFD	Extracted Groundwater			VFD	Extracted Groundwater		
	Flow Recorder Rate (gpm)	Flow Meter Rate (gpm)	Totalizer (x1000) (gal)	Pressure (psig)	Frequency (Hz)	Flow Recorder Rate (gpm)	Flow Meter Rate (gpm)	Totalizer (x1000) (gal)	Pressure (psig)	Frequency (Hz)	Flow Recorder Rate (gpm)	Flow Meter Rate (gpm)	Totalizer (x1000) (gal)	Pressure (psig)	Frequency (Hz)
1/15/2018	1,004	1,005	1,474,620 ⁽⁵⁾	54	51.4	922	918	831,412	60	50.1	412	412	60,960	50	41.3
2/6/2018	1,003	1,002	1,502,920	55	51.7	920	923	853,906	60	50.0	413	412	74,467	50	41.0
3/13/2018	999	996	1,554,450	56	51.4	919	922	901,268	60	49.9	411	411	95,873	50	41.0
4/10/2018	1,002	999	1,593,412	55	51.3	821	822	934,732	58	47.3	514	515	113,996	50	43.0
5/15/2018	1,002	1,000	1,643,106	56	51.3	817	820	975,371	60	47.4	514	512	139,278	50	42.8
6/15/2018	1,000	1,002	1,687,992	55	51.3	819	821	1,012,056	59	47.4	507	513	162,336	50	43.8
7/11/2018	1,003	999	1,724,099	54	51.2	819	824	1,041,575	59	47.4	509	511	180,784	50	43.0
8/21/2018	1,005	999	1,782,912	53	51.2	818	822	1,089,688	59	47.4	512	511	210,729	58	43.0
9/5/2018	1,001	998	1,804,364	53	51.3	820	822	1,107,246	60	47.4	513	511	222,015	50	43.0
10/9/2018	1,001	1,001	1,849,752	54	51.2	818	820	1,144,568	59	47.3	510	510	245,166	50	42.8
11/6/2018	1,000	1,000	1,890,292	54	51.2	820	822	1,177,576	58	47.2	509	509	265,971	50	42.8
12/5/2018	1,002	1,002	1,931,731	56	51.2	820	822	1,211,336	59	47.1	514	514	287,141	50	42.8

Notes and Abbreviations on last page.

Table 1B
 Summary of Weekly Monitoring Data^(1,2) 2018
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Date	AIR STRIPPER						HEAT EXCHANGER				
	Influent Water Flow					Ambient Influent Air Temperature	(°F)	Air Inlet Temperature (°F)	Steam Inlet Pressure (psig)	Air Outlet Temperature (°F)	Calculated Temperature Differential (°F)
	Flow Recorder Rate (gpm)	Flow Meter Rate (gpm)	Totalizer (x1000) (gal)	Influent Water Temperature (°F)	Influent Water Pressure (psig)						
1/15/2018	2,292	2,390	43,935,877	60	29.5	21	59	31	80	21	
2/6/2018	2,294	2,295	44,549,319	59	30.0	60	59	32	82	23	
3/13/2018	2,274	2,276	45,732,769	60	29.5	60	60	30	82	22	
4/10/2018	2,294	2,296	46,617,132	59	30.0	60	58	32	81	23	
5/15/2018	2,294	2,294	47,746,183	60	30.0	59	61	32	82	21	
6/15/2018	2,506	2,623	48,778,372	60	30.0	72	60	30	80	20	
7/11/2018	2,293	2,390	49,314,951	60	29.5	78	60	20	81	21	
8/21/2018	2,289	2,393	50,660,160	60	30.0	67	60	20	80	20	
9/5/2018	2,284	2,385	51,155,353	60	30.0	80	60	20	80	20	
10/9/2018	2,284	2,285	52,208,670	60	30.0	65	60	20	80	20	
11/6/2018	2,295	2,295	53,132,789	59	30.0	50	60	20	80	20	
12/5/2018	2,280	2,278	54,077,122	59	30.0	59	60	20	79	19	

Notes and Abbreviations on last page.

Table 1B
 Summary of Weekly Monitoring Data^(1,2) 2018
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Date	PROCESS BLOWER TO RVPGAC TREATMENT UNITS				CONDENSER				AIR COMPRESSOR			
	Blower Influent Pressure (iwc)	VIV Position (% open)	Blower Effluent Pressure (iwc)	Calculated Blower Static Pressure (iwc)	Cooling Water		Condensed Steam Water Temperature (°F)					
					Influent Temperature ⁽³⁾ (°F)	Effluent Temperature (°F)	Calculated Temperature Increase (°F)					
1/15/2018	7.0	100	26.0	33.0	53.5	86	32.5	94	108			
2/6/2018	7.0	100	25.0	32.0	59.0	77	18.0	84	112			
3/13/2018	6.8	100	25.0	31.8	59.0	76	17.0	82	110			
4/10/2018	6.8	100	26.0	32.8	59.0	80	21.0	81	110			
5/15/2018	8.5	60 ⁽⁴⁾	15.0	23.5	59.0	76	17.0	79	108			
6/15/2018	7.6	50	16.5	24.1	61.5	80	18.5	80	110			
7/11/2018	7.8	50	17.0	24.8	60.0	82	22.0	95	102			
8/21/2018	7.6	50	18.0	25.6	59.5	83	23.5	95	110			
9/5/2018	7.8	50	18.0	25.8	61.0	85	24.0	105	102			
10/9/2018	7.3	60	19.0	26.3	60.0	80	20.0	98	106			
11/6/2018	8.4	60	20.0	28.4	60.0	82	22.0	90	102			
12/5/2018	7.6	60	20.0	27.6	59.0	82	23.0	74	108			

Notes and Abbreviations on last page.

Table 1B
 Summary of Weekly Monitoring Data^(1,2) 2018
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Date	T102 VAPOR DISCHARGE		T102 WEIR		FORCE MAIN	REGENERATIVE VAPOR PHASE TREATMENT UNITS							
	Effluent Treated Vapor		Effluent Treated Groundwater			Desorb							
	Flow (cfm)	Temperature (°F)	Flow Meter Rate (gpm)	Totalizer (x1000) (gal)		Distribution System Pressure (psig)	Desorb Bed (A/B)	Time Into Cycle (min)	Influent Steam Pressure (psig)	Influent Steam Temperature (°F)	Desorb Bed Temperature (°F)	Effluent Steam Temperature (°F)	
1/15/2018	7,900	82	2,347	219,808	52.7	B	134	2.2	231	170	105		
2/6/2018	8,180	86	1,109	247,430	75.5	A	43	3.4	238	163	203		
3/13/2018	8,010	91	1,064	303,048	72.7	A	40	3.2	238	165	198		
4/10/2018	8,080	84	1,072	344,391	72.8	B	31	3.3	236	155	201		
5/15/2018	8,570	80	1,131	404,848	76.1	B	30	3.5	234	156	202		
6/15/2018	8,000	85	1,123	453,430	77.2	A	30	5.0	250	161	176		
7/11/2018	7,960	90	970	491,604	76.0	A	51	4.0	198	180	103		
8/21/2018	7,770	85	1,086	549,978	81.0	A	47	2.0	234	170	92		
9/5/2018	7,640	95	1,026	571,867	80.7	A	119	6.0	240	180	120		
10/9/2018	7,850	88	1,058	618,744	79.0	B	38	3.2	240	150	201		
11/6/2018	8,150	87	969	660,909	73.0	B	40	3.3	239	150	201		
12/5/2018	8,020	83	1,235	702,613	63.0	A	31	3.2	242	158	199		

Notes and Abbreviations on last page.

Table 1B
Summary of Weekly Monitoring Data^(1,2) 2018
Tower 102 Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Operational data collected weekly by Northrop Grumman and supplemented by monthly Arcadis measurements. For clarity, data shown is representative of taken from a single weekly site visit or monthly Arcadis visit.
- (2) Instantaneous values from field-mounted instruments, except otherwise noted.
- (3) Measurement taken with Infrared temperature gun.
- (4) Due to a carbon change out, the VIV position was decreased from 100% to 60% open.
- (5) Well 17 Totalizer reading taken from SCADA, due to typographical errors during the weekly monitoring event.

--	Parameter not collected/recorded
°F	degrees Fahrenheit
cfm	cubic feet per minute
ft	feet
gal	gallons
gpm	gallons per minute
iwc	inches of water column
min	minutes
psig	pounds per square inch, gauge
scfm	standard cubic feet per minute
NA	Not Analyzed
NC	Not Calculated
SCADA	Supervisory Control and Data Acquisition
T102	Tower 102
RVPGAC	Regenerative Vapor Phase Granular Activated Carbon
VIV	Variable Influent Vane
VFD	Variable Frequency Drive

Table 2
 Summary of Non-Routine Maintenance, 2018,
 ONCT Treatment System, Operable Unit 2
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Date Completed	Maintenance Item ⁽¹⁾	Description/Comments
04/05/18 - 04/06/18	T96 Supplemental carbon	Lead bed carbon changeout completed on 4/06/18.
04/25/18	T102 Regen Carbon Changeout	Regenerative Vapor Phase Carbon Bed A changeout completed.
04/26/18	T102 Regen Carbon Changeout	Regenerative Vapor Phase Carbon Bed B changeout completed.
05/09/18	T96 Boiler	Boiler blow-down pump station piping replaced.
05/13/18	T96 Exhaust Fan Maintenance	Building exhaust fan bearing replaced.
06/28/18	T102 Air Stripper Influent Water Sampling Port	New sample port installed on 6/28/18.
07/12/18	Outfall 005 and Outfall 006 Basin Fencing	Replaced chain link fencing and added privacy slats.
07/26/18 - 07/28/18	T96 RVPGAC carbon changeout	RVPGAC carbon changeout on was completed on 7/28/18 for Beds A & B.
05/31/18 - 07/30/18	T102 reinsulate piping	Piping throughout treatment system was reinsulated and duct work was repaired.
07/28/18 - 08/01/18	West Basin maintenance	West Basin - South - maintenance and scraping was completed by Lasar
08/01/18	T96 Oxy Blower	The Tower 96 supplemental blower had a bearing failure on 7/12/18. On 8/01/18, a spare blower was used and the system operated at 60% of normal capacity due to the decreased blower size. Well 1 and Well 3R both operated at a reduced flow rate of 500 gpm.
08/09/18	Thermostat Boxes	Tower 102 effluent water sample port heat tape and thermostat box replaced.
08/23/18	South Basin Chamber "D" Cover design	Grating lid design undertaken and expected to be completed during 2019.
08/30/18	T96 Oxy Blower	The Tower 96 spare blower was removed and the supplemental blower was put into service on 8/30/18. The system returned to normal operation with Well 1 and Well 3R operating at 800 gpm and 700 gpm respectively.
09/18/18	T102 Effluent Air Duct	Effluent air duct replaced on 9/18/18.
09/20/18	South Basin Distribution Chamber "D" Gate	Minor gate repairs undertaken by Lasar with additional repairs expected to be completed during 2019.
09/20/18	SB Distribution Chamber "C" Repair	Chamber C repair, extension on sluice gate shaft was replaced & silt was removed during September.
10/25/18	T96 Well 1 Flow Meter	New sparring meter installed.
11/15/18	Well 1 Replace and Scale Pressure Transducer	Pressure transducer was replaced and calibrated.
11/19/18	T96 Replace Effluent Duct Flange	Replaced effluent duct flange the week of 11/19/18.
11/28/18	Distribution Valve	Delta Well replaced pressure relief valve on distribution line at Tower 96 clearwell.
11/29/18	South Basin maintenance	South Basin - Central maintenance, scraping, and staff gauge installation was completed.
12/01/18	RVPGAC Bed B Influent Steam Valve	Steam valve replaced.
12/03/18	T96 Belt Tension	STI repaired Oxy Blower bearings and installed new belt (system left off)
12/04/18	T96 Oxy Blowers	STI performed vibration analysis and balanced Oxy Blower and adjusted belt (system restarted).

Notes and Abbreviations:

(1) Maintenance items were completed, as necessary, based on observations of the treatment system during the routine daily and weekly site visits.

RVPGAC Regenerative Vapor Phase Granular Activated Carbon

SCADA Supervisory Control and Data Acquisition

T96 Tower 96 treatment system

T102 Tower 102 treatment system

OXY Occidental Chemical Corporation/Hooker Chemical/RUCO Polymer Corporation

Table 3
Operational Summary for the On-Site Portion of the OU2 Groundwater Remedy, Fourth Quarter and Annual 2018⁽¹⁾ Reporting Period
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York

	Quarterly Flow Rates (gpm)		Quarterly Flow Volumes (MG)			Annual Flow Volumes (MG)			Quarterly VOC Concentrations (µg/L)		VOC Mass Removed (lbs) ⁽⁷⁾		
	Design ⁽²⁾	Average ^(3,4)	Design ⁽²⁾	Actual ^(3,4)	% of Design	Design ⁽²⁾	Actual ^(3,4)	% of Design	TCE ⁽⁵⁾	TVOC ^(5,6)	Quarterly	Annual	Cumulative
Influent Groundwater													
Well 1 ^(11,12)	800	799	106.0	96.7	91%	417.0	365.7	88%	578	600	485	1,879	47,858
Well 3R ^(11,12)	700	707	92.7	85.9	93%	364.9	327.9	90%	268	300	215	919	91,508
Well 17 ⁽¹¹⁾	1,000	1,004	132.5	132.6	100%	521.3	512.6	98%	98	120	133	553	53,580
Well 18 ^(11,12)	600	806	79.5	106.2	134%	312.8	418.2	134%	40	61	54	224	6,593
Well 19 ^(11,12)	700	507	92.7	66.9	72%	364.9	253.9	70%	109	130	73	293	8,673
Total⁽¹³⁾	3,800	3,823	503	488	97%	1,981	1,878	95%	--	--	960	3,868	208,212
Efluent Groundwater⁽⁸⁾													
Calpine	100 - 400	236	--	31.3	--	--	83.2	--	--	--	--	--	--
OXY Biosparge ⁽¹⁰⁾	2 - 42	0	--	0	--	--	0.0	--	--	--	--	--	--
West Recharge Basins	1,112 - 1,455	2,377	--	314.9	--	--	1,233.5	--	--	0.6	--	--	--
South Recharge Basins ⁽¹²⁾	2,231	1,073	295.6	142.1	48%	1,163.0	560.5	48%	--	1.4	--	--	--
Total⁽¹⁴⁾	--	3,686	--	488	--	--	1,877	--	--	--	--	--	--
Additional Flow to South Recharge Basins													
Storm Water Runoff Contributing to South Recharge Basins Flow Volume ⁽¹⁴⁾	--	--	--	37.3	--	--	118.0	--	--	--	--	--	--
Total Flow Volume to South Recharge Basins^(12,14,15)			296	179	60%	1,163.0	678.5	58%					
Treatment Efficiencies⁽⁹⁾													
Tower 96 System:	>99.9%												
Tower 102 System:	>99.9%												

Notes and abbreviations on last page.

Table 3
Operational Summary for the On-Site Portion of the OU2 Groundwater Remedy, Fourth Quarter and Annual 2018⁽¹⁾ Reporting Period
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Quarterly reporting period: September 30, 2018 through December 31, 2018; Annual reporting period: January 3, 2018 through December 31, 2018.
- (2) "Design" flow rates were determined for the five remedial wells and for the South Recharge Basins based on computer modeling (ARCADIS G&M, Inc. 2003c, modified in April 2005). Flow rates for Calpine, OXY Biosparge and West Recharge Basins are typical flow rates and are provided for reader information. "Design" flow volumes represent the volume of water that should be pumped/discharged during the reporting period and is calculated by multiplying the design rate by the reporting period duration.
- (3) "Average" flow rates for the remedial wells represent the average actual pumping rates when the pumps are operational and do not take into account the time that a well is not operational. During this quarterly reporting period, the remedial wells operated for the following percentage of the time: Well 1 (91.4%), Well 3R (91.6%), Well 17 (99.7%), Well (99.5%), and Well 19 (99.7%). "Actual" volumes are determined via totalized values computed by SCADA using the instantaneous flow rates transmitted from local flow meters.
- (4) "Average" flow rates for the system discharges represent the average flow rate during the entire reporting period and are determined by dividing the total flow during the reporting period by the reporting period duration. The Calpine and South Recharge Basins flow volumes are determined via totalized values computed by SCADA using the instantaneous flow rates transmitted from local flow meters. The West Recharge Basin flow is calculated by subtracting the cumulative flow to the other discharges from the total influent flow. Actual flow to the recharge basins is greater, as shown, because storm water combines with the plant effluent prior to discharge to the recharge basins.
- (5) The TCE and TVOC concentrations for the remedial wells are from the quarterly sampling event performed during this reporting period on December 6, 2018.
- (6) The TVOC concentration for the two sets of recharge basins are their respective average monthly SPDES concentration for the current quarter.
- (7) TVOC mass removed for the reporting period is calculated by multiplying the TVOC concentration from the quarterly sampling event and the quantity of water pumped during the reporting period.
- (8) There are four discharges for the effluent groundwater: South Recharge Basins, West Recharge Basins, Calpine and OXY Biosparge system. Treated water is continuously discharged to the south and west recharge basins, and is available "on-demand" to both the Calpine Power Plant (Calpine) for use as make-up water, and the biosparge remediation system operated by Occidental Chemical (OXY Biosparge).
- (9) Treatment System Efficiencies are calculated by dividing the difference between the remedial well flow weighted influent and effluent TVOC concentrations by the remedial well flow weighted influent concentration.
- (10) Occidental Chemical has not reported any water usage for the OXY Biosparge system since May 2016.
- (11) The downtime during Fourth Quarter 2018 was minor and due to typical operation and maintenance with the exception of Tower 96. Tower 96 shut down from July 12, 2018 through August 1, 2018 due to failure and repair of supplemental blower shaft bearings. See Note 12 for detail on reduced percent design flow values.
- (12) During the third quarter, the pumping rates for Wells 1 and 3R were reduced from August 1, 2018 to August 30, 2018 due to supplemental bower repairs at Tower 96. The pumping rates for Wells 18 and 19 continued to be adjusted to maximize capture efficiency. Additionally, flow was diverted from the South Basins to the West Basins to accommodate basin rehabilitation work at the center most of the South Basins. Average pumping rates and modified South Basin recharge rates are shown above.
- (13) Total pumpage/recharge rates are accurate to ±15% due to limitations in metering.
- (14) Storm Water Runoff Volume is calculated by multiplying the adjusted tributary area and NOAA precipitation data for the reporting periods. The adjusted tributary area is tributary area that is adjusted by the runoff coefficient to exclude the infiltration volume from the total rainfall volume. The tributary area, runoff coefficient, and adjusted tributary area are from Dvirk and Bartilucci Consulting Engineers' Storm Water Permit Evaluation Report (January, 28, 2010). The NOAA precipitation data are calculated as a sum of NOAA daily precipitation data for the reporting period. NOAA precipitation data are retrieved from Station GHCND:USW00054787 - FARMINGDALE REPUBLIC AIRPORT, NY US for October and December; Station GHCND:US1NYNS0030 - PLAINEEDGE, NY US for November as data was not available for the typical station.
- (15) Total Flow Volume to South Recharge Basins is estimated as a sum of flow volumes contributed from the Effluent Groundwater to South Recharge Basins and from Storm Water Runoff to South Recharge Basins.

--	Not Applicable	NOAA	National Oceanic and Atmospheric Administration
ug/L	micrograms per liter	SCADA	Supervisory Controls and Data Acquisition
gpm	gallons per minute	SPDES	State Pollution Discharge Elimination System
lbs	pounds	TCE	trichloroethene
MG	million gallons	TVOC	total volatile organic compounds
		VOC	volatile organic compounds

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 1 WELL 1 2/28/2018	WELL 1 WELL 1 5/10/2018	WELL 1 WELL 1 9/5/2018	WELL 1 WELL 1 12/6/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 2.5	<0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 5.0	<1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 5.0	<1.0	< 1.0
1,1-Dichloroethane	5	0.69 J	< 5.0	0.71 J	0.84 J
1,1-Dichloroethene	5	1.6	2.7	2.6	1.0
1,2-Dichloroethane	5	< 1.0	< 5.0	<1.0	< 1.0
1,2-Dichloropropane	5	4.0	4.2 J	4.3	4.4
2-Butanone (MEK)	50	< 10	< 50	<10	< 10
2-Hexanone (MBK)	50	< 5.0	< 25	<5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 25	<5.0	< 5.0
Acetone	50	< 10	< 50	<10	< 10
Benzene	1	< 0.50	< 2.5	<0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 5.0	<1.0	< 1.0
Bromoform	50	< 1.0	< 5.0	<1.0	< 1.0
Bromomethane	5	< 2.0	< 10	<2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 10	<2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 5.0	<1.0	< 1.0
Chlorobenzene	5	< 1.0	< 5.0	<1.0	< 1.0
Chloroethane	5	< 1.0	< 5.0	<1.0	< 1.0
Chloroform	7	0.34 J	< 2.5	<0.50	0.51
Chloromethane	5	< 1.0	< 5.0	<1.0	< 1.0
cis-1,2-Dichloroethene	5	5.0	5.9	5.6	5.4
cis-1,3-Dichloropropene	5	< 1.0	< 5.0	<1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 5.0	<1.0	< 1.0
Ethylbenzene	5	< 1.0	< 5.0	<1.0	< 1.0
Methylene Chloride	5	< 0.50	< 2.5	<0.50	< 0.50
Styrene	5	< 1.0	< 5.0	<1.0	< 1.0
Tetrachloroethene	5	18.4	20.1	19.4	18.3
Toluene	5	< 1.0	< 5.0	<1.0	< 1.0
trans-1,2-Dichloroethene	5	< 0.50	< 2.5	<0.50	< 0.50
trans-1,3-Dichloropropene	5	< 1.0	< 5.0	<1.0	< 1.0
Trichloroethylene	5	558	631	554	578
Trichlorotrifluoroethane (Freon 113)	5	3.5	< 2.5	3.8	< 0.50
Vinyl Chloride	2	< 0.50	< 2.5	<0.50	< 0.50
Xylene-o	5	< 1.0	< 5.0	<1.0	< 1.0
Xylene-m,p	5	< 1.0	< 5.0	<1.0	< 1.0
Total VOCs ⁽⁴⁾		590	660	590	600
1,4-Dioxane ⁽²⁾	NS	10.2	10.4	6.4	9.4

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 3R WELL 3R 2/28/2018	WELL 3R WELL 3R 5/10/2018	WELL 3R WELL 3R 9/5/2018	WELL 3R WELL 3R 12/6/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	0.60	0.66	<0.50	0.56
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethane	5	1.3	1.4	1.3	1.5
1,1-Dichloroethene	5	3.7	3.9	3.5	3.1
1,2-Dichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	<1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	<10	< 10
2-Hexanone (MBK)	50	< 5.0	< 5.0	<5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 5.0	<5.0	< 5.0
Acetone	50	< 10	< 10	<10	< 10
Benzene	1	< 0.50	< 0.50	<0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	<1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	<1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	<2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	<2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	<1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	<0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
cis-1,2-Dichloroethene	5	3.9	4.2	3.7	3.8
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	<0.50	< 0.50
Styrene	5	< 1.0	< 1.0	<1.0	< 1.0
Tetrachloroethene	5	25.6	27.8	26.4	26.5
Toluene	5	< 1.0	< 1.0	<1.0	< 1.0
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Trichloroethylene	5	306	332	272	268
Trichlorotrifluoroethane (Freon 113)	5	3.3	2.1	2.8	< 0.50
Vinyl Chloride	2	2.2	2.0	1.9	1.9
Xylene-o	5	< 1.0	< 1.0	<1.0	< 1.0
Xylene-m,p	5	< 1.0	< 1.0	<1.0	< 1.0
Total VOCs ⁽⁴⁾		350	370	310	300
1,4-Dioxane ⁽²⁾	NS	15.0	15.0	11.0	13.0

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	96 EFFLUENT 96 EFFLUENT 2/28/2018	96 EFFLUENT 96 EFFLUENT 5/10/2018	96 EFFLUENT 96 EFFLUENT 9/5/2018	96 EFFLUENT 96 EFFLUENT 12/6/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	<0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
1,2-Dichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	<1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	<10	< 10
2-Hexanone (MBK)	50	< 5.0	< 5.0	<5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 5.0	<5.0	< 5.0
Acetone	50	< 10	< 10	<10	< 10
Benzene	1	< 0.50	< 0.50	<0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	<1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	<1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	<2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	<2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	<1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	<0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	<0.50	< 0.50
Styrene	5	< 1.0	< 1.0	<1.0	< 1.0
Tetrachloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
Toluene	5	< 1.0	< 1.0	<1.0	< 1.0
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Trichloroethylene	5	< 0.50	0.43 J	<0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 0.50	< 0.50	<0.50	< 0.50
Vinyl Chloride	2	< 0.50	< 0.50	<0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	<1.0	< 1.0
Xylene-m,p	5	< 1.0	< 1.0	<1.0	< 1.0
Total VOCs ⁽⁴⁾		0.0	0.43	0.0	0.0
1,4-Dioxane ⁽²⁾	NS	12.5	11.9	9.0	10.0

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 17 WELL 17 2/28/2018	WELL 17 REP-022818-JJC-1 2/28/2018	WELL 17 WELL 17 5/10/2019	WELL 17 WELL 17 9/5/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	0.28 J	<0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	<1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	<1.0
1,1-Dichloroethane	5	0.83 J	0.83 J	0.83 J	0.74 J
1,1-Dichloroethene	5	1.5	1.5	1.8	1.4
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	<1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	0.36 J	<1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	<10
2-Hexanone (MBK)	50	< 5.0	< 5.0	< 5.0	<5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 5.0	< 5.0	<5.0
Acetone	50	< 10	< 10	< 10	<10
Benzene	1	< 0.50	< 0.50	< 0.50	<0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	<1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	<1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	<2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	<2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	< 1.0	<1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	<1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	<1.0
Chloroform	7	< 0.50	< 0.50	< 0.50	<0.50
Chloromethane	5	< 1.0	< 1.0	< 1.0	<1.0
cis-1,2-Dichloroethene	5	2.7	2.5	2.9	2.4
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	<1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	<1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	<1.0
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	<0.50
Styrene	5	< 1.0	< 1.0	< 1.0	<1.0
Tetrachloroethene	5	19.8	20.3	21.3	18.1
Toluene	5	< 1.0	< 1.0	< 1.0	<1.0
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	<0.50
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	<1.0
Trichloroethylene	5	106	107	111	96.4
Trichlorotrifluoroethane (Freon 113)	5	3.4	3.5	3.7	2.5
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	<0.50
Xylene-o	5	< 1.0	< 1.0	< 1.0	<1.0
Xylene-m,p	5	< 1.0	< 1.0	< 1.0	<1.0
Total VOCs ⁽⁴⁾		130	140	140	120
1,4-Dioxane ⁽²⁾	NS	8.85	9.12	9.48	4.8

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 17 REP-090518-JJC-1 9/5/2018	WELL 17 WELL 17 12/6/2018	WELL 18 WELL 18 2/28/2018	WELL 18 WELL 18 5/10/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	<0.50	< 0.50	0.45 J	0.49 J
1,1,2,2-Tetrachloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	0.76 J	0.79 J	1.3	1.3
1,1-Dichloroethene	5	1.5	1.4	3.5	3.6
1,2-Dichloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	<1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	<10	< 10	< 10	< 10
2-Hexanone (MBK)	50	<5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	<5.0	< 5.0	< 5.0	< 5.0
Acetone	50	<10	< 10	< 10	< 10
Benzene	1	<0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	<1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	<1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	<2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	<2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	<1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	<1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	<0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	<1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	2.6	2.5	2.7	2.9
cis-1,3-Dichloropropene	5	<1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	<1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	<1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	<0.50	< 0.50	< 0.50	< 0.50
Styrene	5	<1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	18.7	19.0	13.5	14.3
Toluene	5	<1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	<0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	<1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	98.4	97.5	44.1	45.7
Trichlorotrifluoroethane (Freon 113)	5	2.6	2.5	1.6	1.7
Vinyl Chloride	2	<0.50	< 0.50	< 0.50	< 0.50
Xylene-o	5	<1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p	5	<1.0	< 1.0	< 1.0	< 1.0
Total VOCs ⁽⁴⁾		120	120	67	70
1,4-Dioxane ⁽²⁾	NS	5.1	8.6	6.89	7.73

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 18 WELL 18 9/5/2018	WELL 18 WELL18 12/6/2018	WELL 18 REP-120618-JJC-1 12/6/2018	WELL 19 WELL 19 2/28/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	<0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	1.2	1.3	1.4	0.59 J
1,1-Dichloroethene	5	2.8	2.9	3.0	1.5
1,2-Dichloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	<1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	<10	< 10	< 10	< 10
2-Hexanone (MBK)	50	<5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	<5.0	< 5.0	< 5.0	< 5.0
Acetone	50	<10	< 10	< 10	< 10
Benzene	1	<0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	<1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	<1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	<2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	<2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	<1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	<1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	<1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	<0.50	< 0.50	< 0.50	0.41 J
Chloromethane	5	<1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	2.6	2.8	2.8	15
cis-1,3-Dichloropropene	5	<1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	<1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	<1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	<0.50	< 0.50	< 0.50	< 0.50
Styrene	5	<1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	13.5	14.0	14.3	6.3
Toluene	5	<1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	<0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	<1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	38.5	39.8	40.7	115
Trichlorotrifluoroethane (Freon 113)	5	<0.50	< 0.50	< 0.50	< 0.50
Vinyl Chloride	2	<0.50	< 0.50	< 0.50	< 0.50
Xylene-o	5	<1.0	< 1.0	< 1.0	< 1.0
Xylene-m,p	5	<1.0	< 1.0	< 1.0	< 1.0
Total VOCs ⁽⁴⁾		59	61	62	140
1,4-Dioxane ⁽²⁾	NS	4.9	5.9	6.2	6.05

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	WELL 19 WELL 19 5/10/2018	WELL 19 REP-051018-SC-1 5/10/2018	WELL 19 WELL 19 9/5/2018	WELL 19 WELL 19 12/6/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	0.33 J	0.35 J	<0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethane	5	0.68 J	0.72 J	0.59 J	0.65 J
1,1-Dichloroethene	5	1.6	1.7	1.2	1.4
1,2-Dichloroethane	5	0.43 J	0.38 J	<1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	<1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	<10	< 10
2-Hexanone (MBK)	50	< 5.0	< 5.0	<5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 5.0	<5.0	< 5.0
Acetone	50	< 10	< 10	<10	< 10
Benzene	1	< 0.50	< 0.50	<0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	<1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	<1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	<2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	<2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	<1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroform	7	0.40 J	0.46 J	<0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
cis-1,2-Dichloroethene	5	16.6	17.1	14.7	15.5
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	<0.50	< 0.50
Styrene	5	< 1.0	< 1.0	<1.0	< 1.0
Tetrachloroethene	5	6.6	6.9	6.2	6.3
Toluene	5	< 1.0	< 1.0	<1.0	< 1.0
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Trichloroethylene	5	125	126	108	109
Trichlorotrifluoroethane (Freon 113)	5	1.3	1.4	<0.50	< 0.50
Vinyl Chloride	2	< 0.50	< 0.50	<0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	<1.0	< 1.0
Xylene-m,p	5	< 1.0	< 1.0	<1.0	< 1.0
Total VOCs ⁽⁴⁾		150	160	130	130
1,4-Dioxane ⁽²⁾	NS	7.08	5.60	4.4	4.6

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents ⁽¹⁾ (units in µg/L)	Location ID: Sample ID: Sample Date:	102 EFFLUENT 102 EFFLUENT 2/28/2018	102 EFFLUENT 102 EFFLUENT 5/10/2018	102 EFFLUENT 102 EFFLUENT 9/5/2018	102 EFFLUENT T102 EFFLUENT 12/6/2018
Volatile Organic Compounds (VOCs)⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	<0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,1-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
1,2-Dichloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	<1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	<10	< 10
2-Hexanone (MBK)	50	< 5.0	< 5.0	<5.0	< 5.0
4-methyl-2-pentanone (MIK)	50	< 5.0	< 5.0	<5.0	< 5.0
Acetone	50	< 10	< 10	<10	< 10
Benzene	1	< 0.50	< 0.50	<0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	<1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	<1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	<2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	<2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	<1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	<1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	<0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	<1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	<1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	<0.50	< 0.50
Styrene	5	< 1.0	< 1.0	<1.0	< 1.0
Tetrachloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
Toluene	5	< 1.0	< 1.0	<1.0	< 1.0
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	<0.50	< 0.50
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	<1.0	< 1.0
Trichloroethylene	5	< 0.50	< 0.50	<0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 0.50	< 0.50	<0.50	< 0.50
Vinyl Chloride	2	< 0.50	< 0.50	<0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	<1.0	< 1.0
Xylene-m,p	5	< 1.0	< 1.0	<1.0	< 1.0
Total VOCs ⁽⁴⁾		0.0	0.0	0.0	0.0
1,4-Dioxane ⁽²⁾	NS	8.39 J	8.75 J	5.5	6.9

Notes and abbreviations on last page.

Table 4
Concentrations of Constituents in Remedial Wells and
Treatment System Effluents, 2018, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016c).
- (2) VOC samples analyzed using USEPA Method 8260C. Samples collected prior to June 15, 2018 were analyzed for 1,4-Dioxane using USEPA Method 522-SIM. Samples collected are analyzed for 1,4-Dioxane using USEPA Method 8270D-SIM-CLLE.
- (3) SCG values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values are listed.
- (4) Total VOC results rounded to two significant figures.
- (5)

 Compound detected in exceedance of NYSDEC SCG Criteria.

1.2 Bold value indicates a detection.

< 5.0 Compound is not detected above its laboratory quantification limit.

J Constituent value is estimated.

µg/L micrograms per liter

NS None Specified

NYSDEC New York State Department of Conservation

OU2 Operable Unit 2

REP blind replicate sample

SCG Standards, Criteria and Guidance value

TOGs Technical and Operational Guidance Series

USEPA United States Environmental Protection Agency

VOC volatile organic compound

CLLE Continuous Liquid-Liquid Extraction

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3) 2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID:	96 INFLUENT	96 INFLUENT	96 INFLUENT	96 INFLUENT
	Sample ID:	T96 INFLUENT (AA) 2/28/2018	T96 INFLUENT (AA) 5/15/2018	T96 INFLUENT (AA) 9/5/2018	T96 INFLUENT (AA) 12/7/2018
<u>Volatile Organic Compounds (VOCs)⁽¹⁾</u>					
1,1,1-Trichloroethane		19	17	17	13
1,1,2,2-Tetrachloroethane		< 14	<0.69	<0.55	< 0.69
1,1,2-Trichloroethane		< 11	2.2	2.7	2.4
1,1-Dichloroethane		40.9	37	41.7	37
1,1-Dichloroethene		124	110	118	99.9
1,2-Dichloroethane		< 16	2.3	2.2	1.9
1,2-Dichloropropane		91	83.2	98.4	86
Benzene		< 13	1.3	1.2	1.5
Bromodichloromethane		< 13	<0.67	<0.54	< 0.67
Bromoform		< 8.3	<0.41	<0.33	< 0.41
Bromomethane		< 16	<0.78	<0.62	< 0.78
Carbon Disulfide		< 12	<0.62	<0.50	< 0.62
Carbon Tetrachloride		< 5.0	3.4	3.4	2.5
Chlorobenzene		< 18	1.2	1.5	1.2
Chloroethane		< 11	2.9	3.4	2.4
Chloroform		13 J	12	15	13
Chloromethane		< 8.3	1.1	0.70	0.83
cis-1,2-Dichloroethene		186	161	201	120
cis-1,3-Dichloropropene		< 18	<0.91	<0.73	< 0.91
Dibromochloromethane		< 17	<0.85	<0.68	< 0.85
Ethylbenzene		< 17	0.56 J	<0.69	< 0.87
Methylene Chloride		< 14	11	0.73	1.7
Styrene		< 17	<0.85	<0.68	< 0.85
Tetrachloroethene		1,010	712	848	536
Toluene		< 15	0.68 J	0.53 J	1.1
trans-1,2-Dichloroethene		< 16	1.7	2.3	1.8
trans-1,3-Dichloropropene		< 18	<0.91	<0.73	< 0.91
Trichloroethylene		13,000	17,400	18,700	14,400
Trichlorotrifluoroethane (Freon 113)		122	101	123	102
Vinyl Chloride		45.5	31.7	32.5	24
Xylene-o		< 17	<0.87	<0.69	0.87
Xylene-m,p		< 17	1.6	<0.69	1.5
Total VOCs⁽²⁾		14,651	18,695	20,213	15,451

Notes and abbreviations on last page.

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3) 2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID:	96 MID-EFFLUENT T96 MIDTRAIN (AA) 1/31/2018	96 MID-EFFLUENT T96 MIDTRAIN (AA) 2/28/2018	96 MID-EFFLUENT T96 MIDTRAIN (AA) 5/15/2018	96 MID-EFFLUENT T96 MIDTRAIN (AA) 9/5/2018
<u>Volatile Organic Compounds (VOCs)⁽¹⁾</u>					
1,1,1-Trichloroethane		< 11	< 11	10	3.9
1,1,2,2-Tetrachloroethane		< 14	< 14	<0.69	<0.55
1,1,2-Trichloroethane		< 11	< 11	0.54 J	<0.44
1,1-Dichloroethane		27	29	40.9	32
1,1-Dichloroethene		94.0	99.5	132	110
1,2-Dichloroethane		< 16	< 16	1.6	0.65
1,2-Dichloropropane		14 J	18 J	33	13
Benzene		< 13	< 13	0.48 J	0.27 J
Bromodichloromethane		< 13	< 13	<0.67	<0.54
Bromoform		< 8.3	< 8.3	<0.41	<0.33
Bromomethane		< 16	< 16	<0.78	<0.62
Carbon Disulfide		< 12	< 12	<0.62	<0.50
Carbon Tetrachloride		< 5.0	< 5.0	2.1	0.18 J
Chlorobenzene		< 18	< 18	<0.92	<0.74
Chloroethane		< 11	< 11	3.7	3.7
Chloroform		< 20	< 20	13	7.8
Chloromethane		< 8.3	< 8.3	1.2	0.87
cis-1,2-Dichloroethene		117	129	158	148
cis-1,3-Dichloropropene		< 18	< 18	<0.91	<0.73
Dibromochloromethane		< 17	< 17	<0.85	<0.68
Ethylbenzene		< 17	< 17	<0.87	<0.69
Methylene Chloride		< 14	< 14	0.87	0.76
Styrene		< 17	< 17	<0.85	<0.68
Tetrachloroethene		47	62	151	44
Toluene		< 15	< 15	<0.75	<0.60
trans-1,2-Dichloroethene		< 16	< 16	1.9	1.8
trans-1,3-Dichloropropene		< 18	< 18	<0.91	<0.73
Trichloroethylene		3,510	2,860	5430	3,650
Trichlorotrifluoroethane (Freon 113)		64	67	95.8	54
Vinyl Chloride		41.4	40.9	39.6	35.3
Xylene-o		< 17	< 17	<0.87	<0.69
Xylene-m,p		< 17	< 17	<0.87	<0.69
Total VOCs⁽²⁾		3,914	3,306	6116	4,106

Notes and abbreviations on last page.

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3) 2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID:	96 MID-EFFLUENT T96 MIDTRAIN (AA) 12/7/2018	96 SUP MIDTRAIN T96 SUP MIDTRAIN (AA) 1/31/2018	96 SUP MIDTRAIN T96 SUP MIDTRAIN (AA) 2/28/2018	96 SUP MIDTRAIN T96 SUP MIDTRAIN (AA) 5/15/2018
Volatile Organic Compounds (VOCs)⁽¹⁾					
1,1,1-Trichloroethane		4.1	4.8	< 11	<0.54
1,1,2,2-Tetrachloroethane		< 0.69	< 2.7	< 14	<0.68
1,1,2-Trichloroethane		< 0.55	< 2.2	< 11	<0.54
1,1-Dichloroethane		28	28	36	5.3
1,1-Dichloroethene		97.1	114	115	78.9
1,2-Dichloroethane		0.73 J	< 3.2	< 16	<0.81
1,2-Dichloropropane		21	5.5	< 18	<0.92
Benzene		0.38 J	2.2 J	< 13	<0.64
Bromodichloromethane		< 0.67	< 2.7	< 13	<0.66
Bromoform		< 0.41	< 1.7	< 8.3	<0.41
Bromomethane		< 0.78	< 3.1	< 16	<0.78
Carbon Disulfide		< 0.62	< 2.5	< 12	<0.62
Carbon Tetrachloride		< 0.25	< 1.0	< 5.0	<0.25
Chlorobenzene		< 0.92	< 3.7	< 18	<0.92
Chloroethane		2.6	3.4	< 11	4.0
Chloroform		7.8	6.8	10 J	0.83 J
Chloromethane		0.7	1.2 J	< 8.3	1.4
cis-1,2-Dichloroethene		131	113	154	16
cis-1,3-Dichloropropene		< 0.91	< 3.6	< 18	<0.91
Dibromochloromethane		< 0.85	< 3.4	< 17	<0.84
Ethylbenzene		< 0.87	< 3.5	< 17	<0.87
Methylene Chloride		0.9	1.1 J	< 14	3.2
Styrene		< 0.85	< 3.4	< 17	<0.85
Tetrachloroethene		92.2	< 1.1	< 5.4	0.35
Toluene		< 0.75	208	170	0.64 J
trans-1,2-Dichloroethene		1.6	< 3.2	< 16	<0.79
trans-1,3-Dichloropropene		< 0.91	< 3.6	< 18	<0.91
Trichloroethylene		3,190	2,710	3,930	14
Trichlorotrifluoroethane (Freon 113)		54	54	75	2.0
Vinyl Chloride		25	42.4	41.9	43.7
Xylene-o		< 0.87	< 3.5	< 17	<0.87
Xylene-m,p		< 0.87	< 3.5	< 17	<0.87
Total VOCs⁽²⁾		3,657	3,294	4,532	170

Notes and abbreviations on last page.

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3) 2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID: 96 EFFLUENT T96 EFFLUENT (AA) 1/31/2018	96 EFFLUENT T96 EFFLUENT (AA) 2/28/2018	96 EFFLUENT T96 EFFLUENT (AA) 4/13/2018	96 EFFLUENT T96 EFFLUENT (AA) 5/15/2018
<u>Volatile Organic Compounds (VOCs)⁽¹⁾</u>				
1,1,1-Trichloroethane	< 1.1	0.60	4.2	4.5
1,1,2,2-Tetrachloroethane	< 1.4	< 0.55	<0.55	<0.69
1,1,2-Trichloroethane	< 1.1	< 0.44	<0.44	<0.55
1,1-Dichloroethane	13	25	28	8.9
1,1-Dichloroethene	91.2	107	49.2	46.4
1,2-Dichloroethane	< 1.6	< 0.65	0.89	0.61 J
1,2-Dichloropropane	< 1.8	< 0.74	<0.74	1.8
Benzene	< 1.3	< 0.51	<0.51	2.3
Bromodichloromethane	< 1.3	< 0.54	<0.54	<0.67
Bromoform	< 0.83	< 0.33	<0.33	<0.41
Bromomethane	< 1.6	< 0.62	<0.62	<0.78
Carbon Disulfide	< 1.2	< 0.50	<0.50	<0.62
Carbon Tetrachloride	< 0.50	< 0.20	0.51	0.47
Chlorobenzene	< 1.8	< 0.74	<0.74	<0.92
Chloroethane	3.2	2.5	3.2	3.2
Chloroform	2.0	4.9	8.8	3.3
Chloromethane	1.7	2.5	3.1	4.7
cis-1,2-Dichloroethene	36.0	95.6	109	52.7
cis-1,3-Dichloropropene	< 1.8	< 0.73	<0.73	<0.91
Dibromochloromethane	< 1.7	< 0.68	<0.68	<0.85
Ethylbenzene	< 1.7	< 0.69	<0.69	<0.87
Methylene Chloride	< 1.4	1.2	0.87	0.69
Styrene	< 1.7	< 0.68	<0.68	<0.85
Tetrachloroethene	0.75	1.4	<0.22	1.8
Toluene	160	98.0	0.83	117
trans-1,2-Dichloroethene	< 1.6	1.2	0.99	0.63 J
trans-1,3-Dichloropropene	< 1.8	< 0.73	<0.73	<0.91
Trichloroethylene	17	86.5	232	1,590
Trichlorotrifluoroethane (Freon 113)	4.8	21	80.5	41
Vinyl Chloride	40.4	30.4	31.2	34.8
Xylene-o	< 1.7	< 0.69	<0.69	<0.87
Xylene-m,p	< 1.7	< 0.69	<0.69	<0.87
Total VOCs⁽²⁾	370	478	553	1,915

Notes and abbreviations on last page.

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3) 2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID: 96 EFFLUENT T96 EFFLUENT (AA)	96 EFFLUENT T96 EFFLUENT (AA) 12/7/2018
Volatile Organic Compounds (VOCs)⁽¹⁾		
1,1,1-Trichloroethane	0.76	2.8
1,1,2,2-Tetrachloroethane	<0.55	< 0.69
1,1,2-Trichloroethane	<0.44	< 0.55
1,1-Dichloroethane	36	25
1,1-Dichloroethene	75.3	80.1
1,2-Dichloroethane	0.36 J	0.77 J
1,2-Dichloropropane	1.6	2.3
Benzene	0.93	0.73
Bromodichloromethane	<0.54	< 0.67
Bromoform	<0.33	< 0.41
Bromomethane	<0.62	< 0.78
Carbon Disulfide	0.53	< 0.62
Carbon Tetrachloride	<0.20	< 0.25
Chlorobenzene	<0.74	< 0.92
Chloroethane	2.6	2.1
Chloroform	7.3	7.8
Chloromethane	4.1	1.9
cis-1,2-Dichloroethene	132	119
cis-1,3-Dichloropropene	<0.73	< 0.91
Dibromochloromethane	<0.68	< 0.85
Ethylbenzene	<0.69	< 0.87
Methylene Chloride	0.69	0.83
Styrene	<0.68	< 0.85
Tetrachloroethene	1.6	0.61
Toluene	75.4	44.8
trans-1,2-Dichloroethene	2.2	1.3
trans-1,3-Dichloropropene	<0.73	< 0.91
Trichloroethylene	693	720
Trichlorotrifluoroethane (Freon 113)	21	63
Vinyl Chloride	27.1	22
Xylene-o	<0.69	< 0.87
Xylene-m,p	<0.69	< 0.87
Total VOCs⁽²⁾	1,082	1,095

Notes and abbreviations on last page.

Table 5A
Summary of Influent and Mid-Effluent Air Concentrations and
Effluent Air Emissions^(1,3)2018, Tower 96 Treatment System
Northrop Grumman Systems Corporation
Operable Unit 2, Bethpage, New York



Notes and Abbreviations:

- (1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.
- (2) Total VOCs represents the sum of individual concentrations of compounds detected rounded to the nearest whole number.
- 19** bold value indicates a detection
J Compound detected below its reporting limit; value is estimated.
µg/m³ micrograms per cubic meter
ELAP Environmental Laboratory Approval Program
NYSDOH New York State Department of Health
USEPA United States Environmental Protection Agency
VOC Volatile Organic Compound

Table 5B

Summary of Influent Air Concentrations and Effluent Air Emissions⁽¹⁾ 2018,
 Tower 102 Treatment System,
 Northrop Grumman Systems Corporation,
 Operable Unit 2, Bethpage, New York



Design & Consultancy
 for natural and
 built assets

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID: 102 INFLUENT T102 INFLUENT (AA) 2/28/2018	102 INFLUENT T102 INFLUENT (AA) 5/10/2018	102 INFLUENT T102 INFLUENT (AA) 9/5/2018	102 INFLUENT T102 INFLUENT (AA) 12/7/2018
Volatile Organic Compounds (VOCs)⁽¹⁾				
1,1,1-Trichloroethane	17	17	16	8.2
1,1,2,2-Tetrachloroethane	< 14	<0.55	<0.55	< 0.69
1,1,2-Trichloroethane	< 11	1.4	1.4	1.4
1,1-Dichloroethane	53.0	57.9	63.5	37
1,1-Dichloroethene	109	115	124	61.5
1,2-Dichloroethane	< 16	3.8	3.6	3.3
1,2-Dichloropropane	< 18	5.5	7.9	7.9
Benzene	< 13	0.77	0.73	0.8
Bromodichloromethane	< 13	<0.54	<0.54	< 0.67
Bromoform	< 8.3	<0.33	<0.33	< 0.41
Bromomethane	< 16	<0.62	<0.62	< 0.78
Carbon Disulfide	< 12	<0.50	<0.50	< 0.62
Carbon Tetrachloride	< 5.0	4.2	4.3	3.0
Chlorobenzene	< 18	<0.74	<0.74	< 0.92
Chloroethane	< 11	<0.42	<0.42	< 0.53
Chloroform	16 J	15	17	11
Chloromethane	< 8.3	0.99	0.89	0.81
cis-1,2 Dichloroethene	420	236	500	319
cis-1,3-Dichloropropene	< 18	<0.73	<0.73	< 0.91
Dibromochloromethane	< 17	<0.68	<0.68	< 0.85
Ethylbenzene	< 17	<0.69	<0.69	< 0.87
Methylene Chloride	< 14	0.63	0.56	< 0.69
Styrene	< 17	<0.68	<0.68	< 0.85
Tetrachloroethene	423	205	351	335
Toluene	< 15	0.53 J	0.87	0.60 J
trans-1,2-Dichloroethene	< 16	4.0	5.2	2.6
trans-1,3-Dichloropropene	< 18	<0.73	<0.73	< 0.91
Trichloroethylene	2,970	1,710	3,480	2,380
Trichlorotrifluoroethane (Freon 113)	107	95.0	110	50.0
Vinyl Chloride	< 2.0	<0.082	0.25	< 0.10
Xylene-o	< 17	0.35 J	<0.69	< 0.87
Xylene-m,p	< 17	0.87	<0.69	< 0.87
Total VOCs⁽²⁾	4,115	2,474	4,687	3,222

Notes and abbreviations on last page.

Table 5B

Summary of Influent Air Concentrations and Effluent Air Emissions⁽¹⁾ 2018,
 Tower 102 Treatment System,
 Northrop Grumman Systems Corporation,
 Operable Unit 2, Bethpage, New York

Constituents (Units in $\mu\text{g}/\text{m}^3$)	Location ID: Sample ID: 102 EFFLUENT T102 EFFLUENT (AA) 2/28/2018	102 EFFLUENT T102 EFFLUENT (AA) 5/10/2018	102 EFFLUENT T102 EFFLUENT (AA) 9/5/2018	102 EFFLUENT T102 EFFLUENT (AA) 12/7/2018
Volatile Organic Compounds (VOCs)⁽¹⁾				
1,1,1-Trichloroethane	< 0.44	<0.44	<0.55	0.51
1,1,2,2-Tetrachloroethane	< 0.55	<0.55	<0.69	< 0.55
1,1,2-Trichloroethane	< 0.44	<0.44	<0.55	< 0.44
1,1-Dichloroethane	16	0.65	2.1	29
1,1-Dichloroethene	82.5	2.9	12	99.1
1,2-Dichloroethane	< 0.65	<0.65	<0.81	< 0.65
1,2-Dichloropropane	< 0.74	<0.74	<0.92	< 0.74
Benzene	< 0.51	<0.51	<0.64	< 0.51
Bromodichloromethane	< 0.54	<0.54	<0.67	< 0.54
Bromoform	< 0.33	<0.33	<0.41	< 0.33
Bromomethane	< 0.62	<0.62	<0.78	< 0.62
Carbon Disulfide	< 0.50	<0.50	<0.62	< 0.50
Carbon Tetrachloride	< 0.20	<0.20	<0.25	< 0.20
Chlorobenzene	< 0.74	<0.74	<0.92	< 0.74
Chloroethane	< 0.42	<0.42	<0.53	< 0.42
Chloroform	2.1	<0.78	<0.98	3.6
Chloromethane	1.2	0.97	0.85	0.78
cis-1,2 Dichloroethene	19	2.8	5.6	61.1
cis-1,3-Dichloropropene	< 0.73	<0.73	<0.91	< 0.73
Dibromochloromethane	< 0.68	<0.68	<0.85	< 0.68
Ethylbenzene	< 0.69	<0.69	<0.87	< 0.69
Methylene Chloride	2.2	1.4	1.7	0.87
Styrene	< 0.68	<0.68	<0.85	< 0.68
Tetrachloroethene	< 0.22	0.28	<0.27	0.37
Toluene	< 0.60	<0.60	<0.75	< 0.60
trans-1,2-Dichloroethene	0.37 J	<0.63	<0.79	1.00
trans-1,3-Dichloropropene	< 0.73	<0.73	<0.91	< 0.73
Trichloroethylene	3.8	1.6	1.1	21
Trichlorotrifluoroethane (Freon 113)	26	<0.61	2.7	68
Vinyl Chloride	0.41	<0.082	0.28	0.25
Xylene-o	< 0.69	<0.69	<0.87	< 0.69
Xylene-m,p	< 0.69	<0.69	<0.87	< 0.69
Total VOCs⁽²⁾	154	11	26	286

Notes and abbreviations on last page.

Table 5B

Summary of Influent Air Concentrations and Effluent Air Emissions⁽¹⁾ 2018,
Tower 102 Treatment System,
Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York

Notes and Abbreviations:

- (1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.
- (2) Total VOCs represents the sum of individual concentrations of compounds detected rounded to the nearest whole number.
- 8.2** bold value indicates a detection
- J Compound detected below its reporting limit; value is estimated.
- µg/m³ micrograms per cubic meter
- ELAP Environmental Laboratory Approval Program
- NYSDOH New York State Department of Health
- USEPA United States Environmental Protection Agency
- VOC volatile organic compound

Table 5C
Summary of TCE Mass Removal, Tower 96 Treatment System,
Annual 2018, Northrop Grumman Systems Corporation,
Operable Unit 2, Bethpage, New York^(1,2,3)

Date	TCE Concentration ($\mu\text{g}/\text{m}^3$)				TCE Mass Emission ⁽²⁾ (lbs)	Percent of Allowable TCE Emissions ⁽³⁾ 12 Month Rolling Average
	T96 INFLUENT	T96 MIDTRAIN	T96 SUP MIDTRAIN	T96 EFFLUENT		
12/13/2017	18,600	6,610	95	10	0.1	91.4%
1/31/2018	NS	3,510	2,710	17	0.4	91.3%
2/28/2018	13,000	2,860	3,930	86.5	1.0	91.4%
4/13/2018 ⁽⁴⁾	13,000	NS	NS	232	4.4	52.9%
5/15/2018	17,400	5,430	14	1,590	22	44.5%
9/5/2018 ⁽⁵⁾	18,700	3,650	NS	693	34	20.0%
12/7/2018	14,400	3,190	NS	720	29	18.1%

Notes and Abbreviations:

(1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.

(2) TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time since the preceding day of sampling.

TCE (lb) = TCE Concentration [$\mu\text{g}/\text{m}^3$] x Days x Flow Rate [ft³/min] x (1 m³/35 ft³) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

(3) Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

(4) Carbon changeout for Tower 96 lead supplemental bed was completed on April 6, 2018.

(5) Regenerative Carbon changeout for Tower 96 was completed on July 28, 2018.

$\mu\text{g}/\text{m}^3$ micrograms per cubic meter

lbs pounds

CRR-NY Codes, Rules and Regulations of the State of New York

ELAP Environmental Laboratory Approval Program

NS Not Sampled

NYSDOH New York State Department of Health

SUP Supplemental

TCE Trichloroethylene

USEPA United States Environmental Protection Agency

VOC Volatile Organic Compound

Table 5D
Summary of TCE Mass Removal, Tower 102 Treatment System,
Annual 2018, Northrop Grumman Systems Corporation, Operable Unit 2,
Bethpage, New York^(1,2,3)

Date	TCE Concentration ($\mu\text{g}/\text{m}^3$)		TCE Mass Emission ⁽²⁾		Percentage of Allowable TCE Emissions ⁽³⁾	
	T102 INFLUENT	T102 EFFLUENT	lbs	lbs/day	Period	12 Month Rolling Average
12/21/2017	2,340	5	0.2	0.00	0.3%	1.1%
2/28/2018	2,970	4	0.2	0.00	0.2%	0.9%
5/10/2018	1,710	2	0.1	0.00	0.1%	1.2%
9/5/2018 ⁽⁴⁾	3,480	1.1	0.1	0.00	0.1%	0.4%
12/7/2018	2,380	21	1.4	0.01	1.1%	0.4%

Notes and Abbreviations:

- (1) Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.
- (2) TCE Mass Emission calculated based on the exhaust air flow rate on the day of sampling and the period of time since the preceding sampling day.

TCE (lb) = TCE Concentration [$\mu\text{g}/\text{m}^3$] x Days x Flow Rate [ft^3/min] x (1 $\text{m}^3/35 \text{ ft}^3$) x (60 min/hr) x (24 hr/day) x (0.000001 g/1 ug) x (0.0022 lb/g)

- (3) Percent of allowable TCE emissions to date is a time-weighted annual rolling average based on the 500 lb/year emission limit specified in the CRR-NY 212-2.2 Table 2. High Toxicity Air Contaminant List, revised April 1, 2017.

- (4) Vapor sample concentrations of 647 and 2 from September 5, 2018 were erroneously reported last quarter in PPB_v and were corrected to $\mu\text{g}/\text{m}^3$ in this reporting period.

$\mu\text{g}/\text{m}^3$ micrograms per cubic meter

lbs pounds

ELAP Environmental Laboratory Approval Program

NYSDOH New York State Department of Health

PPB_v parts per billion by unit volume

T102 Tower 102

TCE trichloroethene

USEPA United States Environmental Protection Agency

VOC volatile organic compound

Table 6A
 Summary of AERMOD Air Quality Impact Analysis
 Tower 96 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituent	CAS#	T96 Effluent ($\mu\text{g}/\text{m}^3$)	Emission Rate ⁽¹⁾			Scaled Impact - Hourly ⁽²⁾ ($\mu\text{g}/\text{m}^3$)	Scaled Impact - Annual ⁽²⁾ ($\mu\text{g}/\text{m}^3$)	SGC ⁽³⁾ ($\mu\text{g}/\text{m}^3$)	AGC ⁽³⁾ ($\mu\text{g}/\text{m}^3$)	%SGC	% AGC
		12/7/2018	lb/yr	lb/hr	g/s						
1,1,1 - Trichloroethane	00071-55-6	2.8	0.45	5.12E-05	6.45E-06	9.55E-04	2.80E-05	9,000	5,000	0.00%	0.00%
1,1 - Dichloroethane	00075-34-3	25	4.00	4.57E-04	5.76E-05	8.53E-03	2.50E-04	--	6.30E-01	--	0.04%
1,2 - Dichloroethane	00107-06-2	0.77	0.12	1.41E-05	1.77E-06	2.63E-04	7.71E-06	--	3.80E-02	--	0.02%
1,1 - Dichloroethene	00075-35-4	80.1	12.83	1.46E-03	1.85E-04	2.73E-02	8.02E-04	--	200	--	0.00%
Tetrachloroethene	00127-18-4	0.61	0.10	1.12E-05	1.41E-06	2.08E-04	6.11E-06	300	4	0.00%	0.00%
Trichloroethene ⁽⁴⁾	00079-01-6	720	115.32	1.32E-02	1.66E-03	2.46E-01	7.21E-03	20	2.00E-01	1.23%	3.60%
Vinyl Chloride ⁽⁴⁾	00075-01-4	22	3.52	4.02E-04	5.07E-05	7.50E-03	2.20E-04	180,000	1.10E-01	0.00%	0.20%
cis 1,2-Dichloroethene	00156-59-2	119	19.06	2.18E-03	2.74E-04	4.06E-02	1.19E-03	--	63	--	0.00%
trans 1,2-Dichloroethene	00156-60-5	1.3	0.21	2.38E-05	2.99E-06	4.43E-04	1.30E-05	--	63	--	0.00%
Benzene ⁽⁴⁾	00071-43-2	0.73	0.12	1.33E-05	1.68E-06	2.49E-04	7.31E-06	1,300	1.30E-01	0.00%	0.01%
Toluene	00108-88-3	44.8	7.18	8.19E-04	1.03E-04	1.53E-02	4.48E-04	37,000	5,000	0.00%	0.00%
1,2-Dichloropropane	00078-87-5	2.3	0.37	4.21E-05	5.30E-06	7.84E-04	2.30E-05	--	4	--	0.00%
Chloroethane	00078-93-14	2.1	0.34	3.84E-05	4.84E-06	7.16E-04	2.10E-05	--	10,000	--	0.00%
Chloroform	00078-93-15	7.8	1.25	1.43E-04	1.80E-05	2.66E-03	7.81E-05	150	15	0.00%	0.00%
Chloromethane	00078-93-16	1.9	0.30	3.47E-05	4.38E-06	6.48E-04	1.90E-05	22,000	90	0.00%	0.00%
Dichloromethane	00078-93-19	0.83	0.13	1.52E-05	1.91E-06	2.83E-04	8.31E-06	14,000	60	0.00%	0.00%
Trichlorotrifluoroethane (Freon 113)	00078-93-26	63	10.09	1.15E-03	1.45E-04	2.15E-02	6.31E-04	960,000	180,000	0.00%	0.00%

Notes and Abbreviations on next page

Table 6A
 Summary of AERMOD Air Quality Impact Analysis
 Tower 96 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 4,848 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 12/07/2018.

Effluent temperature used in the model was 92°F from direct read in-line gauge.

Trichloroethene (lb/hr) = $(720 \text{ ug/m}^3) \times (4,848 \text{ ft}^3/\text{min}) \times (1 \text{ m}^3/35 \text{ ft}^3) \times (60 \text{ min/hr}) \times (0.000001 \text{ g/1 ug}) \times (0.0022 \text{ lb/g})$

lb/yr = lb/hr x 8,760 hrs/yr

g/s = lb/hr x 1 hr/3,600 sec x 453.59 g/1 lb

(2) Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015, and a stack which is 55 feet high and 20 inches in diameter. The maximum impact from all the years was used for the calculations.

Scaled hourly impact (ug/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ($[\text{ug/m}^3]/[\text{g/s}]$) x Actual emission rate (g/s)

Scaled annual impact (ug/m^3) = AERMOD predicted annual ambient impact at 1 g/s ($[\text{ug/m}^3]/[\text{g/s}]$) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ($[\text{ug/m}^3]/[\text{g/s}]$)	Annual ($[\text{ug/m}^3]/[\text{g/s}]$)
148.05	4.35

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.

(4) Vinyl Chloride and Benzene potential emission rates are less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3). TCE potential emissions are above the trigger limit and require a 12 month rolling average of annual emission to be maintained (see Table 5A) to demonstrate compliance with the 6 CRR-NY 212-2.2 500 lb/year requirement.

AGC	Annual Guideline Concentration	2.8	bold value indicates a detection
CAS #	Chemical Abstracts Service Registry Number	acfm	actual cubic feet per minute
CRR-NY	New York Codes, Rules and Regulations	g/s	grams per second
DAR-1	Division of Air Resources-1	$\mu\text{g/m}^3$	micrograms per cubic meter
-	None Specified	lb/yr	pounds per year
NYSDEC	New York State Department of Environmental Conservation	lb/hr	pounds per hour
SGC	Short-term Guideline Concentration		

Table 6B
 Summary of AERMOD Air Quality Impact Analysis
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituent	CAS#	T102 Effluent ($\mu\text{g}/\text{m}^3$)	Emission Rate ⁽¹⁾			Scaled Impact - Hourly ⁽²⁾ ($\mu\text{g}/\text{m}^3$)	Scaled Impact - Annual ⁽²⁾ ($\mu\text{g}/\text{m}^3$)	SGC ⁽³⁾ ($\mu\text{g}/\text{m}^3$)	AGC ⁽³⁾ ($\mu\text{g}/\text{m}^3$)	%SGC	% AGC
		12/7/2018	lb/yr	lb/hr	g/s						
1,1,1 - Trichloroethane	00071-55-6	0.51	0.13	1.52E-05	1.92E-06	6.69E-04	4.39E-06	9000	5000	0.00%	0.00%
1,1 - Dichloroethane	00075-34-3	29	7.59	8.66E-04	1.09E-04	3.81E-02	2.49E-04	--	6.30E-01	--	0.04%
1,1 - Dichloroethene	00075-35-4	99.1	25.93	2.96E-03	3.73E-04	1.30E-01	8.52E-04	--	200	--	0.00%
Tetrachloroethene	00127-18-4	0.37	0.10	1.11E-05	1.39E-06	4.86E-04	3.18E-06	300	4	0.00%	0.00%
Trichloroethene ⁽⁴⁾	00079-01-6	21	5.49	6.27E-04	7.90E-05	2.76E-02	1.81E-04	20	2.00E-01	0.14%	0.09%
Vinyl Chloride ⁽⁴⁾	00075-01-4	0.25	0.07	7.47E-06	9.41E-07	3.28E-04	2.15E-06	180,000	1.10E-01	0.00%	0.00%
cis-1,2-Dichloroethene	00156-59-2	61.1	15.99	1.82E-03	2.30E-04	8.02E-02	5.25E-04	--	63	--	0.00%
trans-1,2-Dichloroethene	00156-60-5	1.0	0.26	2.99E-05	3.76E-06	1.31E-03	8.60E-06	--	63	--	0.00%
Chloroform	00067-66-3	3.6	0.94	1.08E-04	1.35E-05	4.73E-03	3.10E-05	150	14.7	0.00%	0.00%
Chloromethane	00074-87-3	0.78	0.20	2.33E-05	2.94E-06	1.02E-03	6.71E-06	22,000	90	0.00%	0.00%
Dichloromethane	00075-09-2	0.87	0.23	2.60E-05	3.27E-06	1.14E-03	7.48E-06	14,000	60	0.00%	0.00%
Trichlorotrifluoroethane (Freon 113)	00076-13-1	68	17.79	2.03E-03	2.56E-04	8.93E-02	5.85E-04	960,000	180000	0.00%	0.00%

Table 6B
 Summary of AERMOD Air Quality Impact Analysis
 Tower 102 Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Notes and Abbreviations:

(1) Emission rate calculated based on effluent concentration and a stack air flow rate of 7,919 cfm. The stack air flow rate (in acfm) is taken from the actual stack air flow rate on 12/07/2018.
 Effluent temperature used in the model was 80°F from direct read in-line gauge.

$$\text{Trichloroethene (lb/hr)} = (21 \text{ ug/m}^3) \times (7,919 \text{ ft}^3/\text{min}) \times (1 \text{ m}^3/35 \text{ ft}^3) \times (60 \text{ min/hr}) \times (0.000001 \text{ g/1 ug}) \times (0.0022 \text{ lb/g})$$

$$\text{lb/yr} = \text{lb/hr} \times 8,760 \text{ hrs/yr}$$

$$\text{g/s} = \text{lb/hr} \times 1 \text{ hr/3,600 sec} \times 453.59 \text{ g/1 lb}$$

(2) Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Farmingdale, NY) for the years 2011 through 2015, and a stack which is 69.52 feet high and 24 inches in diameter. The maximum impact from all the years was used for the calculations.

$$\text{Scaled hourly impact (ug/m}^3) = \text{AERMOD predicted hourly ambient impact at 1 g/s ([ug/m}^3]/[g/s]) \times \text{Actual emission rate (g/s)}$$

$$\text{Scaled annual impact (ug/m}^3) = \text{AERMOD predicted annual ambient impact at 1 g/s ([ug/m}^3]/[g/s]) \times \text{Actual emission rate (g/s)}$$

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([ug/m ³]/[g/s])	Annual ([ug/m ³]/[g/s])
348.85	2.29

(3) Short-term and annual guideline concentrations for air toxic pollutants specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.

(4) Vinyl Chloride potential emission rate is less than 0.1 lb/hr and therefore below the trigger emissions for degree of air cleaning requirement (6 CRR-NY 212-2.3). TCE potential emissions are above the trigger limit and require a 12 month rolling average of annual emission to be maintained (see Table 5B) to demonstrate compliance with the 6 CRR-NY 212-2.2 500 lb/year requirement.

AGC	Annual Guideline Concentration	0.51	bold value indicates a detection
CAS #	Chemical Abstracts Service Registry Number	acfm	actual cubic feet per minute
CRR-NY	New York Codes, Rules and Regulations	g/s	grams per second
DAR-1	Division of Air Resources-1	µg/m ³	micrograms per cubic meter
--	None Specified	lb/yr	pounds per year
NYSDEC	New York State Department of Environmental Conservation	lb/hr	pounds per hour
SGC	Short-term Guideline Concentration		

Table 7

Summary of SPDES Equivalency Effluent Water⁽¹⁾ Sample Analytical Results 2018,
 ONCT Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

PARAMETER	Units	Discharge Limit ⁽²⁾	Location ID: Sample ID: Sample Date:	Outfall 005	Outfall 005	Outfall 005	Outfall 005	Outfall 005	Outfall 005
				Outfall 005 1/15/2018	Outfall 005 2/9/2018	Outfall 005 3/16/2018	Outfall 005 4/13/2018	Outfall 005 5/15/2018	Outfall 005 6/15/2018
Volatile Organic Compounds (VOCs)⁽³⁾									
1,1,1-Trichloroethane (TCA)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichlorotrifluoroethane (Freon 113)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene (1,1-DCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene (PCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene (TCE)	µg/L	5		1.3	0.83	0.99	1.3	1.4	1.4
Vinyl Chloride	µg/L	2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TVOCs ⁽⁴⁾				1.3	0.83	0.99	1.3	1.4	1.4
Semivolatile Organic Compounds (SVOCs)⁽⁸⁾									
1,4-Dioxane	µg/L	NA / Monitor		8.66	11.8 J	7.11	6.39	6.33	6.20
Anions⁽⁵⁾									
Nitrogen, (Nitrate+Nitrite)	mg/L	NA		4.4	4.3	4.4	4.4	4.4	4.1
Nitrogen, Total Kjeldahl	mg/L	NA		<0.20	0.18 J	<0.12	<0.12	<0.12	<0.12
Total Nitrogen	mg/L	10		4.4	4.5	4.4	4.4	4.4	4.1
pH - Intake (Tower 102)	S.U.	NA		5.65	5.40 ⁽⁶⁾	5.40	5.50	5.40	5.30
pH - Effluent	S.U.	6.5 - 8.5		6.31	6.30 ⁽⁷⁾	6.30	6.00	6.50	6.60

Notes and Abbreviations on last page.

Table 7

Summary of SPDES Equivalency Effluent Water⁽¹⁾ Sample Analytical Results 2018,
 ONCT Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

PARAMETER	Units	Discharge Limit ⁽²⁾	Location ID: Sample ID: Sample Date:	Outfall 005 7/11/2018	Outfall 005 8/21/2018	Outfall 005 9/5/2018	Outfall 005 10/10/2018	Outfall 005 11/8/2018	Outfall 005 12/6/2018
Volatile Organic Compounds (VOCs)⁽³⁾									
1,1,1-Trichloroethane (TCA)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichlorotrifluoroethane (Freon 113)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene (1,1-DCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene (PCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene (TCE)	µg/L	5		1.3	1.2	1.3	1.5	1.4	1.3
Vinyl Chloride	µg/L	2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TVOCs ⁽⁴⁾				1.3	1.2	1.3	1.5	1.4	1.3
Semivolatile Organic Compounds (SVOCs)⁽⁸⁾									
1,4-Dioxane	µg/L	NA / Monitor		5.7	6.0	4.8	6.1	3.6	5.9
Anions⁽⁵⁾									
Nitrogen, (Nitrate+Nitrite)	mg/L	NA		4.2	4.0	4.3	4.1	4.2	4.2
Nitrogen, Total Kjeldahl	mg/L	NA		<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Total Nitrogen	mg/L	10		4.2	4.0	4.3	4.1	4.2	4.2
pH - Intake (Tower 102)	S.U.	NA		5.40	5.20	5.70	4.70	5.30	5.20
pH - Effluent	S.U.	6.5 - 8.5		6.30	6.20	6.60	6.30	6.60	6.40

Notes and Abbreviations on last page.

Table 7

Summary of SPDES Equivalency Effluent Water⁽¹⁾ Sample Analytical Results 2018,
 ONCT Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

PARAMETER	Units	Discharge Limit ⁽²⁾	Location ID: Sample ID: Sample Date:	Outfall 006 Outfall 006 1/15/2018	Outfall 006 Outfall 006 2/9/2018	Outfall 006 Outfall 006 3/16/2018	Outfall 006 Outfall 006 4/13/2018	Outfall 006 Outfall 006 5/15/2018	Outfall 006 Outfall 006 6/15/2018
Volatile Organic Compounds (VOCs)⁽³⁾									
1,1,1-Trichloroethane (TCA)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichlorotrifluoroethane (Freon 113)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene (1,1-DCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene (PCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene (TCE)	µg/L	5		<0.50	0.67	0.78	0.71	0.86	0.70
Vinyl Chloride	µg/L	2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TVOCs ⁽⁴⁾				0.0	0.67	0.78	0.0	0.86	0.70
Semivolatile Organic Compounds (SVOCs)⁽⁸⁾									
1,4-Dioxane	µg/L	NA / Monitor		12.9	13.0	10.1	9.99	8.59	7.6
Anions⁽⁵⁾									
Nitrogen, (Nitrate+Nitrite)	mg/L	NA		4.9	4.8	4.8	4.8	4.8	4.8
Nitrogen, Total Kjeldahl	mg/L	NA		0.20	<0.12	<0.12	<0.12	<0.12	<0.12
Total Nitrogen	mg/L	10		5.1	4.8	4.8	4.8	4.8	4.8
pH - Intake (Tower 96)	S.U.	NA		5.30	5.50 ⁽⁶⁾	5.30	5.50	5.40	5.00
pH - Effluent	S.U.	6.5 - 8.5		6.09	6.60	6.30	6.40	6.80	6.40

Notes and Abbreviations on last page.

Table 7

Summary of SPDES Equivalency Effluent Water⁽¹⁾ Sample Analytical Results 2018,
 ONCT Treatment System, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

PARAMETER	Units	Discharge Limit ⁽²⁾	Location ID: Sample ID: Sample Date:	Outfall 006						
				7/11/2018	8/21/2018	9/5/2018	10/10/2018	11/8/2018	12/6/2018	
Volatile Organic Compounds (VOCs)⁽³⁾										
1,1,1-Trichloroethane (TCA)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1,2-Trichlorotrifluoroethane (Freon 113)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,1-Dichloroethene (1,1-DCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
cis-1,2-dichloroethene	µg/L	5		<0.50	<0.50	0.37	<0.50	<0.50	<0.50	<0.50
Methylene Chloride	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Tetrachloroethene (PCE)	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
trans-1,2-dichloroethene	µg/L	5		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethene (TCE)	µg/L	5		0.60	0.80	0.46	0.36	0.76	0.79	
Vinyl Chloride	µg/L	2		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
TVOCs ⁽⁴⁾				0.60	0.80	0.83	0.36	0.76	0.79	
Semivolatile Organic Compounds (SVOCs)⁽⁸⁾										
1,4-Dioxane	µg/L	NA / Monitor		7.9	7.5	4.1	11.0	5.7	8.0	
Anions⁽⁵⁾										
Nitrogen, Nitrate+Nitrite	mg/L	NA		4.6	4.4	4.6	4.7	4.5	4.6	
Nitrogen, Total Kjeldahl	mg/L	NA		<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
Total Nitrogen	mg/L	10		4.6	4.4	4.6	4.7	4.5	4.6	
pH - Intake (Tower 96)	mg/L	NA		5.30	5.20	5.4	5.50	5.20	5.20	
pH - Effluent	mg/L	6.5 - 8.5		6.50	6.20	6.5	6.20	6.70	6.40	

Notes and Abbreviations on last page.

Table 7
Summary of SPDES Effluent Water Sample Analytical Results 2018,
ONCT Treatment System, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) SPDES effluent water samples are collected at a point closest to the respective Outfalls to each of the recharge basins, not directly from the treatment system tower effluent ports.
- (2) Discharge limits are per the SPDES permit dated March 1, 1996 and subsequent renewals, and per the SPDES permit equivalency; dated October 12, 2017, amended on July 30, 2018 and transmitted on August 9, 2018.
- (3) Samples were analyzed for permit specified VOCs using USEPA Method 624.
- (4) TVOC represents the sum of individual concentrations of VOCs detected. Results rounded to two significant figures.
- (5) Samples were analyzed for Nitrogen, (Nitrate+Nitrite) and Total Kjeldahl Nitrogen (TKN) by USEPA Methods 353.2 and 351.2, respectively. Total Nitrogen is calculated as the sum of Nitrogen, (Nitrate+Nitrite) and TKN concentrations and is rounded to two significant figures.
- (6) Influent pH based on flow weighted average of applicable individual well pH levels.
- (7) T102 Air Stripper Effluent pH is reported for Outfall 005 due to pH meter malfunction due to anomalous readings identified during QA/QC.
- (8) A SPDES equivalency letter was issued October 2017, at that time 1,4-Dioxane was added to the analyte list. Discussion regarding pH and other analytes are ongoing with NYSDEC, Basin Discharges are still being reported under SPDES Permit.
- Not Analyzed
- 0.67** Value indicates a detection
- < 0.50 Compound not detected above its laboratory quantification limit
- µg/L micrograms per liter
- mg/L milligrams per liter
- J Constituent value is estimated
- DUP Field Duplicate Sample
- NA Not Applicable
- ONCT On-Site Containment System
- S.U. Standard Units
- SPDES State Pollution Discharge Elimination System
- USEPA United States Environmental Protection Agency
- VOCs Volatile Organic Compounds
- SVOCs Semivolatile Organic Compounds

Table 8
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, April 30 to May 1, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)
Shallow Wells⁽¹⁾			
FW-03	124.30	57.70	66.60
N-9921 ⁽²⁾	94.23	NM	NM
N-10597	109.85	41.96	67.89
N-10600	102.41	39.87	62.54
N-10631	103.47	40.28	63.19
N-10633	103.80	42.65	61.15
N-10634	101.20	41.68	59.52
N-10821 ⁽²⁾	91.58	NM	NM
GM-15SR	109.35	46.93	62.42
GM-15I	109.29	46.66	62.63
GM-16SR	115.86	48.12	67.74
GM-16I	115.81	48.34	67.47
GM-17I	115.83	43.85	71.98
GM-17SR	115.79	44.75	71.04
GM-18S	107.60	42.78	64.82
GM-18I	109.03	43.81	65.22
GM-19I	109.86	46.14	63.72
GM-19S	109.86	45.97	63.89
GM-20I	103.88	40.00	63.88
GM-21I	105.72	41.45	64.27
GM-21S	105.81	40.11	65.70
GM-74I	107.42	43.15	64.27
GM-78S	104.94	42.49	62.45
GM-78I	105.06	42.74	62.32
GM-79S (N-10628)	100.88	41.40	59.48
HN-24S	122.73	53.03	69.70
HN-29I	116.42	48.37	68.05
HN-40S	116.35	51.10	65.25
HN-40I	115.91	50.77	65.14
HN-42S	120.32	54.52	65.80
HN-42I	119.61	52.83	66.78
MW-3R	101.45	37.41	64.04
Intermediate Wells⁽¹⁾			
N-10624	93.61	33.53	60.08
GM-13D	113.97	47.33	66.64
HN-24I	125.80	53.8	72.00
HN-29D	115.11	48.67	66.44
GM-79I	101.09	41.76	59.33

See Notes and Abbreviations on Last Page

Table 8
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, April 30 to May 1, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)
Deep Wells⁽¹⁾			
N-10627	93.70	33.73	59.97
GM-15D	109.84	48.81	61.03
GM-17D	115.68	49.95	65.73
GM-18D	108.88	46.55	62.33
GM-20D	103.92	41.15	62.77
GM-21D	105.66	44.97	60.69
GM-34D	71.19	14.95	56.24
GM-36D	91.63	35.44	56.19
GM-37D	97.26	39.85	57.41
GM-37D2	97.17	40.62	56.55
GM-38D	91.75	39.60	52.15
GM-39D _A ⁽³⁾	102.23	40.49	61.74
GM-39D _B ⁽³⁾	102.08	42.80	59.28
GM-70D2	99.58	42.12	57.46
GM-73D	104.87	45.33	59.54
GM-74D	107.43	46.95	60.48
GM-78D	103.81	44.75	59.06
GM-79D	101.25	42.77	58.48
BPOW 1-1	73.65	28.31	45.34
BPOW 1-2	73.54	31.39	42.15
BPOW 1-3	71.92	31.55	40.37
BPOW 1-4	56.68	12.25	44.43
BPOW 2-1	58.64	19.66	38.98
Deep2 Wells⁽¹⁾			
GM-15D2	109.78	50.66	59.12
GM-21D2	104.62	49.40	55.22
GM-33D2	106.85	50.00	56.85
GM-34D2	71.19	16.32	54.87
GM-35D2	96.28	40.30	55.98
GM-36D2	91.60	38.83	52.77
GM-38D2	91.56	41.02	50.54
GM-71D2	98.45	42.35	56.10
GM-73D2	104.62	46.98	57.64
GM-73D3	103.88	46.99	56.89
GM-74D2	107.36	52.90	54.46
GM-74D3	106.56	50.44	56.12
GM-75D2	93.63	36.24	57.39
GM-78D2	103.82	46.65	57.17
MW 3-1	115.28	57.70	57.58

See Notes and Abbreviations on Last Page

Table 8
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, April 30 to May 1, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)		
Deep2 Wells⁽¹⁾ (continued)					
Well 1	116.78	86.30	30.48		
Well 3R ⁽⁴⁾	115.28	85.90	29.38		
Well 17	104.10	64.30	39.80		
Well 18	110.00	70.80	39.20		
Well 19	108.70	61.90	46.80		
BPOW 1-5	56.75	12.37	44.38		
BPOW 1-6	57.06	12.90	44.16		
BPOW 2-2	58.50	22.52	35.98		
BPOW 2-3	57.98	22.30	35.68		
BPOW 3-1	61.43	23.25	38.18		
BPOW 3-2	61.82	24.21	37.61		
BPOW 3-3	60.64	21.57	39.07		
BPOW 3-4	62.44	23.30	39.14		
BPOW 4-1R ⁽⁵⁾	67.34	25.71	41.63		
BPOW 4-2R ⁽⁵⁾	67.18	25.59	41.59		
Remedial Well Specific Capacities⁽⁶⁾					
Well ID	Static Depth to Water (ft bmp) ⁽⁷⁾	Pumping Depth to Water (ft bmp)	Drawdown (ft)	Second Quarter 2018 Pumping Rate (Q)(gpm) ⁽⁸⁾	Specific Capacity (Q/s)(gpm/ft)
Well 1	52.90	86.30	33.40	803	24.04
Well 3R	54.80	85.90	31.10	718	23.09
Well 17	42.00	64.30	22.30	1001	44.89
Well 18	47.00	70.80	23.80	819	34.41
Well 19	49.00	61.90	12.90	514	39.84

See Notes and Abbreviations on Last Page

Table 8
Water-Level Measurement Data and Remedial
Well Specific Capacities, April 30 to May 1, 2018
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Well identification (e.g., GM-70D2) does not necessarily designate the actual hydrogeologic zone.
Determination of the hydrogeologic zones is based on the well screen interval and the regional model layering.
- (2) Well was not accessible as drill rig was staged on top of well location
- (3) Monitoring wells were voluntarily monitored to enhance coverage in the Deep and Deep2 zones.
- (4) Surveyed elevation not available, elevation is estimated from topographic map of the area.
- (5) The NAVY abandoned original Wells BPOW4-1 and BPOW4-2 and installed replacement Wells BPOW4-1R and BPOW4-2R between August, 2014 and October, 2014.
- (6) Specific capacity values are qualitative in nature, due to fluctuations in static water levels. Sharp declines in specific capacity could indicate the need for well redevelopment.
- (7) Static Water Level measurements for Well 1 and Well 3R were obtained on August 28, 2018. Water level measurements for Well 18 and Well 19 were obtained September 17, 2014. Water level measurement for Well 19 was obtained August 8, 2017.
- (8) Pumping rate determined at time of pumping depth to water measurement.

ft msl feet relative to mean sea level

ft bmp feet below measuring point

OU2 Operable Unit 2

gpm gallons per minute

NM not measured

Q pumping rate

S drawdown

Table 9
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, October 9 to October 10, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)
Shallow Wells⁽¹⁾			
FW-03	124.30	57.50	66.80
N-9921 ⁽²⁾	94.23	NM	NM
N-10597	109.85	41.66	68.19
N-10600 ⁽²⁾	102.41	39.60	62.81
N-10631	103.47	39.94	63.53
N-10633	103.80	42.86	60.94
N-10634	101.20	41.19	60.01
N-10821	91.58	NM	NM
GM-15SR	109.35	47.33	62.02
GM-15I	109.29	47.04	62.25
GM-16SR	115.86	47.71	68.15
GM-16I	115.81	47.79	68.02
GM-17I	115.83	42.55	73.28
GM-17SR	115.79	42.40	73.39
GM-18S	107.60	41.92	65.68
GM-18I	109.03	42.76	66.27
GM-19I	109.86	46.35	63.51
GM-19S	109.86	46.17	63.69
GM-20I	103.88	39.13	64.75
GM-21I	105.72	42.72	63.00
GM-21S	105.81	42.33	63.48
GM-74I	107.42	44.80	62.62
GM-78S	104.94	42.02	62.92
GM-78I	105.06	42.36	62.70
GM-79S (N-10628)	100.88	41.78	59.10
HN-24S	122.73	52.99	69.74
HN-29I	116.42	48.36	68.06
HN-40S	116.35	51.13	65.22
HN-40I	115.91	50.91	65.00
HN-42S	120.32	53.69	66.63
HN-42I	119.61	53.00	66.61
MW-3R	101.45	36.50	64.95
Intermediate Wells⁽¹⁾			
N-10624	93.61	33.24	60.37
GM-13D	113.97	37.15	76.82
HN-24I	125.80	53.75	72.05
HN-29D	115.66	48.86	66.80
GM-79I	101.09	42.20	58.89

See Notes and Abbreviations on Last Page

Table 9
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, October 9 to October 10, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)
Deep Wells⁽¹⁾			
N-10627	93.70	33.78	59.92
GM-15D	109.84	49.11	60.73
GM-17D	115.68	49.28	66.40
GM-18D	108.88	46.11	62.77
GM-20D	103.92	40.87	63.05
GM-21D	105.66	45.20	60.46
GM-34D	71.19	15.03	56.16
GM-36D	91.63	35.80	55.83
GM-37D	97.26	40.21	57.05
GM-37D2	97.17	40.94	56.23
GM-38D	91.75	38.90	52.85
GM-39D _A ⁽³⁾	102.23	40.21	62.02
GM-39D _B ⁽³⁾	102.08	42.73	59.35
GM-70D2	99.58	42.39	57.19
GM-73D	104.87	45.22	59.65
GM-74D	107.43	47.24	60.19
GM-78D	103.81	44.61	59.20
GM-79D	101.25	43.19	58.06
BPOW 1-1	73.65	29.96	43.69
BPOW 1-2	73.54	32.98	40.56
BPOW 1-3	71.92	33.32	38.60
BPOW 1-4	56.68	13.82	42.86
BPOW 2-1	58.64	21.47	37.17
Deep2 Wells⁽¹⁾			
GM-15D2	109.78	51.03	58.75
GM-21D2	104.62	49.57	55.05
GM-33D2	106.85	49.91	56.94
GM-34D2	71.19	16.55	54.64
GM-35D2	96.28	40.73	55.55
GM-36D2	91.60	38.30	53.30
GM-38D2	91.56	40.95	50.61
GM-71D2	98.45	42.68	55.77
GM-73D2	104.62	46.94	57.68
GM-73D3	103.88	47.15	56.73
GM-74D2	107.36	53.14	54.22
GM-74D3	106.56	50.85	55.71
GM-75D2	93.63	36.39	57.24
GM-78D2	103.82	46.55	57.27
MW 3-1	115.28	58.15	57.13
Well 1	116.78	87.30	29.48
Well 3R ⁽⁴⁾	115.28	88.40	26.88
Well 17	104.10	64.20	39.90
Well 18	110.00	70.60	39.40
Well 19	108.70	62.00	46.70

See Notes and Abbreviations on Last Page

Table 9
 Water-Level Measurement Data and Remedial
 Well Specific Capacities, October 9 to October 10, 2018
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Well Identification	Measuring Point Elevation (ft msl)	Depth to Water (ft bmp)	Water-Level Elevation (ft msl)		
Deep2 Wells⁽¹⁾ (continued)					
BPOW 1-5	56.75	14.23	42.52		
BPOW 1-6	57.06	14.58	42.48		
BPOW 3-4	62.44	26.33	36.11		
BPOW 2-2	58.50	24.09	34.41		
BPOW 2-3	57.98	23.60	34.38		
BPOW 3-1	61.43	26.91	34.52		
BPOW 3-2	61.82	28.84	32.98		
BPOW 3-3	60.64	24.63	36.01		
BPOW 4-1R ⁽⁶⁾	67.34	27.46	39.88		
BPOW 4-2R ⁽⁵⁾	67.18	27.65	39.53		
Remedial Well Specific Capacities⁽⁸⁾					
Well ID	Static Depth to Water (ft bmp) ⁽⁷⁾	Pumping Depth to Water (ft bmp)	Drawdown (ft)	Fourth Quarter 2018 Pumping Rate (Q)(gpm) ⁽⁸⁾	Specific Capacity (Q/s)(gpm/ft)
Well 1	52.90	87.30	34.40	805	23.40
Well 3R	54.80	88.40	33.60	717	21.34
Well 17	42.00	64.20	22.20	1003	45.18
Well 18	47.00	70.60	23.60	818	34.66
Well 19	49.00	62.00	13.00	514	39.54

Notes and Abbreviations:

- (1) Well identification (e.g., GM-70D2) does not necessarily designate the actual hydrogeologic zone. Determination of the hydrogeologic zones is based on the well screen interval and the regional model layering.
 - (2) Well was not accessible as drill rig was staged on top of well location
 - (3) Monitoring wells were voluntarily monitored to enhance coverage in the Deep and Deep2 zones.
 - (4) Surveyed elevation not available, elevation is estimated from topographic maps of the area.
 - (5) The NAVY abandoned original Wells BPOW4-1 and BPOW4-2 and installed replacement Wells BPOW4-1R and BPOW4-2R between August, 2014 and October, 2014.
 - (6) Specific capacity values are qualitative in nature, due to fluctuations in static water levels. Sharp declines in specific capacity could indicate the need for well redevelopment.
 - (7) Static Water Level measurements for Well 1 and Well 3R were obtained on August 28, 2018. Water level measurements for Well 17 and Well 18 were obtained September 17, 2014. Water level measurement for Well 19 was obtained August 8, 2017.
 - (8) Pumping rate determined at time of pumping depth to water measurement.
- ft msl feet relative to mean sea level
 ft bmp feet below measuring point
 OU2 Operable Unit 2
 gpm gallons per minute
 NM not measured
 Q pumping rate
 S drawdown

Table 10
 Concentrations of Volatile Organic Compounds in Groundwater
 Samples Collected from Wells in the Shallow Zone ⁽¹⁾,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	FW-03 10/29/2018	GM-15SR 6/6/2018	GM-15SR 10/30/2018	GM-15I 6/6/2018	GM-15I 10/30/2018	GM-17I 10/26/2018	GM-18I 11/8/2018	GM-20I 6/28/2018	GM-21I 6/27/2018	GM-21S 6/22/2018	GM-74I 6/5/2018	GM-74I 11/1/2018
	NYSDEC SCGs (ug/L) ⁽²⁾												
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Methyl N-Butyl Ketone (2-Hexanone)	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-methyl-2-pentanone	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0 J	< 2.0 J	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.49 J	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	1.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	1.0	< 1.0	0.69 J	0.94 J	< 1.0	< 1.0	< 1.0	0.58 J	0.84 J	0.46 J	1.2	< 1.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		2.4	0	0.69	0.94	0	0	0	1.1	0.84	0.46	1.2	0

See Notes and Abbreviations on Last Page

Table 10
 Concentrations of Volatile Organic Compounds in Groundwater
 Samples Collected from Wells in the Shallow Zone ⁽¹⁾,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-78S GM-78S 6/21/2018	HN-40S HN-40S 6/20/2018	HN-40I HN-40I 6/20/2018	HN-42S HN-42S 6/19/2018	HN-42I HN-42I 6/19/2018	N-10631 N-10631 6/27/2018	N-10631 REP062718CK1 6/27/2018	N-10631 N-10631 10/25/2018
	NYSDEC SCGs (ug/L) ⁽²⁾								
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	<10	<10	<10	<10	<10	<10	<10	<10
Methyl N-Butyl Ketone (2-Hexanone)	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-methyl-2-pentanone	50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Acetone	50	<10	<10	<10	<10	<10	<10	<10	<10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	0.31 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	0.95 J	< 1.0	0.75 J	< 1.0	< 1.0	1.2	1.1	0.88 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0.95	0.31	0.75	0	0	1.2	1.1	0.88

See Notes and Abbreviations on Last Page

Table 10
 Concentrations of Volatile Organic Compounds in Groundwater
 Samples Collected from Wells in the Shallow Zone ⁽¹⁾,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Notes and Abbreviations:

- (1) Well identification (e.g., GM-15I) does not necessarily designate the actual hydrogeologic zone.
 Determination of the hydrogeologic zone is based on the well screen interval and the regional model layering.
- (2) Standards, Criteria, and Guidance (SCG) values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values are listed.

Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016)
 Samples analyzed for the TCL VOCs using USEPA Method 8260C.

TVOCs are rounded to two significant figures.

Bold value indicates a detection.

OU2	Operable Unit 2
SCG	Standards, Criteria and Guidance Value
NYSDEC	New York State Department of Environmental Conservation
TOGs	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
TCL	Target Compound List
VOCs	Volatile Organic Compounds
TVOCs	Total Volatile Organic Compounds (known lab contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)
µg/L	micrograms per Liter
< 5.0	Compound not detected above its laboratory quantification limit.
J	Value is estimated concentration
REP	Blind Duplicate Sample

Table 11
Concentrations of Volatile Organic Compounds in
Groundwater Samples Collected from Wells
in the Intermediate Zone ⁽¹⁾, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-13D GM-13D 6/13/2018	HN-24I HN-24I 10/29/2018	GM-79I GM-79I 10/31/2018	N-10624 N-10624 6/27/2018
	NYSDEC SCG (ug/L) ⁽²⁾				
1,1,1-Trichloroethane	5	0.42 J	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	3.7	0.91 J	< 1.0	< 1.0
1,1-Dichloroethene	5	2.4	1.6	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	<10	<10	<10	<10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	<10	<10	<10	<10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	2.7	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	<2.0	<2.0	<2.0	<2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	27.7	7.2	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	13.4	10	< 1.0	0.32 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		50	20	0	0.32

See Notes and Abbreviations on Last Page

Table 11
Concentrations of Volatile Organic Compounds in
Groundwater Samples Collected from Wells
in the Intermediate Zone ⁽¹⁾, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Notes and Abbreviations:

- (1) Well identification (e.g., GM-21) does not necessarily designate the actual hydrogeologic zone. Determination of the hydrogeologic zone is based on the well screen interval and the regional model layering.
- (2) Standards, Criteria, and Guidance (SCG) values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values are listed.

Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016.)

Samples analyzed for the TCL VOCs using USEPA Method 8260C.

TVOCs are rounded to two significant figures.

Bold value indicates a detection.

OU2 Operable Unit 2

SCG Standards, Criteria and Guidance Value

NYSDEC New York State Department of Environmental Conservation

TOGs Technical and Operational Guidance Series

USEPA United States Environmental Protection Agency

TCL Target Compound List

VOCs Volatile Organic Compounds

TVOCs Total Volatile Organic Compounds (known lab contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)

µg/L micrograms per Liter

 Compound detected in exceedance of NYSDEC SCG Criteria

< 5.0 Compound not detected above its laboratory quantification limit.

J Value is estimated concentration

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-15D GM-15D 6/6/2018	GM-15D GM-15D 10/30/2018	GM-17D GM-17D 6/8/2018	GM-17D GM-17D 10/26/2018	GM-18D GM-18D 6/19/2018
	NYSDEC SCGs (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0 J	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	0.39 J	< 1.0	< 1.0	< 1.0	0.41 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0.39	0	0	0	0.41

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-18D GM-18D 10/18/2018	GM-20D GM-20D 6/28/2018	GM-20D GM-20D 11/7/2018	GM-21D GM-21D 6/18/2018	GM-34D GM-34D 10/31/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	1.3
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	0.29 J	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	5.7
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	6.6
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	0.64 J	49.9	0.70 J	1.1	170
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0.64	50	0.70	1.1	180

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-36D GM-36D 6/26/2018	GM-37D GM-37D 6/29/2018	GM-37D2 GM-37D2 6/29/2018	GM-38D GM-38D 6/7/2018	GM-38D GM-38D 10/23/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	0.46 J	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	0.36 J	1.4	0.43 J	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	0.58 J	0.49 J	0.69 J
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	0.41 J	0.78 J
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	0.69 J
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	0.51 J	3.4	3.5
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	< 1.0	11.0	2.5	80.2	107
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	11	5.5	85	110

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-39DA GM-39DA 10/9/2018	GM-39DB GM-39DB 6/28/2018	GM-39DB GM-39DB 10/19/2018	GM-70D2 GM-70D2 6/27/2018	GM-73D GM-73D 6/5/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	2.1	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	0.60 J	1.1	56.0	7.0	33.4
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0.6	1.1	56	9.1	33

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	GM-73D GM-73D 11/2/2018	GM-74D GM-74D 6/5/2018	GM-74D GM-74D 11/1/2018	GM-78D GM-78D 6/26/2018	GM-79D GM-79D 6/18/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	0.50 J
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	24.4	1.1	0.88 J	2.0	29.8
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		24	1.1	0.88	2.0	30

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID:	GM-78D GM-78D	GM-79D GM-79D	N-10627 N-10627
	Sample Date:	10/24/2018	10/31/2018	6/27/2018
	NYSDEC SCGs ⁽²⁾			
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0
Trichloroethene	5	1.5	19.5	0.32 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0
TVOCs		1.5	20	0.32

See Notes and Abbreviations on Last Page

Table 12
 Concentrations of Volatile Organic Compounds
 in Groundwater Samples Collected from Wells
 in the Deep Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Notes and Abbreviations:

- (1) Well identification (e.g., GM-70D2) does not necessarily designate the actual hydrogeologic zone.
 Determination of the hydrogeologic zone is based on the well screen interval and the regional model layering.
- (2) Standards, Criteria, and Guidance (SCG) values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values are listed.

Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016)

Samples analyzed for the TCL VOCs using USEPA Method 8260C.

TVOCs are rounded to two significant figures.

Bold value indicates a detection.

NYSDEC New York State Department of Environmental Conservation

USEPA United States Environmental Protection Agency

VOCs Volatile Organic Compounds

TVOCs Total Volatile Organic Compounds (known lab contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)

µg/L micrograms per liter

SCG Standards, Criteria and Guidance Value

J Value is estimated concentration.

OU2 Operable Unit 2

TCL Target Compound List

TOGs Technical and Operational Guidance Series

< 5.0 Compound not detected above its laboratory quantification limit.

 Compound detected in exceedance of NYSDEC SCG Criteria

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID:	GM-15D2 GM-15D2	GM-15D2 10/30/2018	GM-21D2 6/14/2018	GM-21D2 10/22/2018	GM-33D2 GM-33D2 6/13/2018
	NYSDEC SCGs(ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	0.31 J	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	0.64 J	0.65 J	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)	50	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0 J	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	4.3	2.6	3.2	1.0	3.5
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5	7.1	6.8	11.6	7.7	18.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	7.5
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		12	10	15	8.7	29

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID:	GM-33D2	GM-34D2	GM-34D2	GM-35D2	GM-35D2
	Sample ID:	GM-33D2	GM-34D2	GM-34D2	GM-35D2	GM-35D2
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	1.2	1.8	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	5.9	5.1	4.8	2.9
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	0.55 J	< 1.0	< 1.0
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	9.1	80.1	73.3	30.0	22.4
Trichlorotrifluoroethane (Freon 113)	5	2.5 J	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		12	87	81	35	25

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID:	GM-36D2	GM-38D2	GM-38D2	GM-38D2
	Sample ID:	GM-36D2	GM-38D2	REP060718MS1	GM38D2
	Sample Date:	6/26/2018	6/7/2018	6/7/2018	10/23/2018
	NYSDEC SCGs ⁽²⁾				
1,1,1-Trichloroethane	5	0.51 J	0.89 J	0.86 J	1.1
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	0.33 J	0.31 J	< 1.0
1,1-Dichloroethane	5	0.85 J	2.5	2.4	4.6
1,1-Dichloroethene	5	0.73 J	1.6	1.6	1.9
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	0.30 J	0.32 J	0.54 J
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	1.8	1.8	0.86 J
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	3.2	117	117	49.1
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0
TVCs		5.3	120	120	58

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID:	GM-71D2 GM-71D2	GM-73D2 GM-73D2	GM-73D2 GM-73D2	GM-73D3 GM-73D3
	Sample Date:	6/15/2018	6/5/2018	11/2/2018	6/25/2018
	NYSDEC SCGs ⁽²⁾				
1,1,1-Trichloroethane	5	1.4	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	4.8	0.29 J	< 1.0	< 1.0
1,1-Dichloroethene	5	2.7	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	0.48 J	0.36 J	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	0.63 J	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	1.5	< 1.0	0.84 J
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	11.7	27.1	26.4	1.7
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		22	29	26	2.5

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID:	GM-73D3	GM-74D2	GM-74D2	GM-74D3	GM-74D3
	Sample ID:	GM-73D3	GM-74D2	GM-74D2	GM-74D3	GM-74D3
	Sample Date:	11/2/2018	6/5/2018	11/1/2018	6/22/2018	11/1/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	0.46 J	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	0.80 J	0.64 J	< 1.0	< 1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	3.3	2.0	4.4	2.8
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	1.8	8.1	6.1	5.8	4.7
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		1.8	13	8.7	10	7.5

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID:	GM-75D2 GM-75D2	GM-75D2 10/24/2018	GM-78D2 6/26/2018	GM-78D2 10/24/2018	MW 3-1 MW 3-1 Sample Date:
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	0.60 J
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	2.7
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	2.6
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	0.46 J
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	15.6
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	0.86 J	< 1.0	< 1.0	< 1.0	19.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	26.0	21.1	1.1	0.99 J	139
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	1.8 J
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	36.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		27	21	1.1	0.99	220

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID:	MW 3-1 MW 3-1	WELL 1 2/28/2018	WELL 1 5/10/2018	WELL 1 9/5/2018	WELL 1 12/6/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	0.55 J	< 0.50	< 2.5	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
1,1-Dichloroethane	5	3.1	0.69 J	< 5.0	0.71 J	0.84 J
1,1-Dichloroethene	5	2.8	1.6	2.7	2.6	1.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	4.0	4.2 J	4.3	4.4
2-Butanone	50	< 10	< 10	< 50	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 25	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 25	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 50	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 2.5	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 10	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 10	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Chloroform	7	< 1.0	0.34 J	< 2.5	< 0.50	0.51
Chloromethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	14.3	5.0	5.9	5.6	5.4
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Methylene Chloride	5	< 2.0	< 0.50	< 2.5	< 0.50	< 0.50
Styrene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Tetrachloroethene	5	30.6	18.4	20.1	19.4	18.3
Toluene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 0.50	< 2.5	< 0.50	< 0.50
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Trichloroethylene	5	156	558	631	554	578
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	3.5	< 2.5	3.8	< 0.50
Vinyl Chloride	2	16.8	< 0.50	< 2.5	< 0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 5.0	< 1.0	< 1.0
TVOCs		220	590	660	590	610

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	WELL 3R WELL 3R 5/10/2018	WELL 3R WELL 3R 9/5/2018	WELL 3R WELL 3R 12/6/2018	WELL 3R WELL 17 2/28/2018
	NYSDEC SCGs ⁽²⁾				
1,1,1-Trichloroethane	5	0.60	0.66	< 0.50	0.56
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	1.3	1.4	1.3	1.5
1,1-Dichloroethene	5	3.7	3.9	3.5	3.1
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	3.9	4.2	3.7	3.8
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	25.6	27.8	26.4	26.5
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	306	332	272	268
Trichlorotrifluoroethane (Freon 113)	5	3.3	2.1	2.8	< 0.50
Vinyl Chloride	2	2.2	2.0	1.9	1.9
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0
TVCs		350	370	310	310
					130

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID:	WELL 17	WELL 17	WELL 17	WELL 17	WELL 17
	Sample ID:	REP-022818-JJC-1	5/10/2018	9/5/2018	REP-090518-JJC-1	9/5/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	0.28 J	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	0.83 J	0.83 J	0.74 J	0.76 J	0.79 J
1,1-Dichloroethene	5	1.5	1.8	1.4	1.5	1.4
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	0.36 J	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	2.5	2.9	2.4	2.6	2.5
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	20.3	21.3	18.1	18.7	19.0
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	107	111	96.4	98.4	97.5
Trichlorotrifluoroethane (Freon 113)	5	3.5	3.7	2.5	2.6	2.5
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVCs		140	140	120	130	120

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	WELL 18 WELL 18 2/28/2018	WELL 18 WELL 18 5/10/2018	WELL 18 WELL 18 9/5/2018	WELL 18 WELL 18 12/6/2018	WELL 18 REP-120618-JJC-1 12/6/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	0.45 J	0.49 J	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	1.3	1.3	1.2	1.3	1.4
1,1-Dichloroethene	5	3.5	3.6	2.8	2.9	3.0
1,2-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	2.7	2.9	2.6	2.8	2.8
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	13.5	14.3	13.5	14.0	14.3
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	44.1	45.7	38.5	39.8	40.7
Trichlorotrifluoroethane (Freon 113)	5	1.6	1.7	< 0.50	< 0.50	< 0.50
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		70	70	60	61	62

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	WELL 19 WELL 19 2/28/2018	WELL 19 WELL 19 5/10/2018	WELL 19 REP-051018-SC-1 5/10/2018	WELL 19 WELL 19 9/5/2018	WELL 19 WELL 19 12/6/2018
	NYSDEC SCGs ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	0.33 J	0.35 J	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	0.59 J	0.68 J	0.72 J	0.59 J	0.65 J
1,1-Dichloroethene	5	1.5	1.6	1.7	1.2	1.4
1,2-Dichloroethane	5	< 1.0	0.43 J	0.38 J	< 1.0	< 1.0
1,2-Dichloropropane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	50	< 10	< 10	< 10	< 10	< 10
2-Hexanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	50	< 10	< 10	< 10	< 10	< 10
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	0.41 J	0.40 J	0.46 J	< 0.50	< 0.50
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	5	15.0	16.6	17.1	14.7	15.5
cis-1,3-Dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	6.3	6.6	6.9	6.2	6.3
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-dichloropropene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	115	125	126	108	109
Trichlorotrifluoroethane (Freon 113)	5	< 0.50	1.3	1.4	< 0.50	< 0.50
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes - m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		140	150	160	130	130

See Notes and Abbreviations on last page.

Table 13
 Concentrations of Volatile Organic Compounds in
 Groundwater Samples Collected from Wells
 in the Deep 2 Zone⁽¹⁾, Operable Unit 2,
 Northrop Grumman Systems Corporation
 Bethpage, New York.

Notes and Abbreviations:

- (1) Well identification (e.g., GM-34D) does not necessarily designate the actual hydrogeologic zone.
 Determination of the hydrogeologic zone is based on the well screen interval and the regional model layering.
- (2) Standards, Criteria, and Guidance (SCG) values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values are listed.

Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016). Samples analyzed for the TCL VOCs using USEPA Method 8260C.

TVOCs are rounded to two significant figures.

Bold value indicates a detection.

OU2	Operable Unit 2
SCG	Standards, Criteria and Guidance Value
NYSDEC	New York State Department of Environmental Conservation
TOGs	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
TCL	Target Compound List
VOCs	Volatile Organic Compounds
TVOCs	Total Volatile Organic Compounds (known lab contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)
µg/L	micrograms per liter
 	Compound detected in exceedance of NYSDEC SCG Criteria
< 5.0	Compound not detected above its laboratory quantification limit.
J	Value is estimated concentration.
REP	Blind Duplicate Sample

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 1-1 BPOW 1-1 4/13/2018	BPOW 1-1 BPOW 1-1 11/14/2018	BPOW 1-2 BPOW 1-2 4/13/2018	BPOW 1-2 BPOW 1-2 11/14/2018	BPOW 1-3 BPOW 1-3 4/12/2018
	NYDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	0.27 J	0.23 J	0.32 J	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	0.23 J	0.29 J	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	1.3	0.87	1.0	0.57	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		1.6	1.3	1.6	0.57	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 1-3 BPOW 1-3 11/14/2018	BPOW 1-4 BPOW 1-4 4/14/2018	BPOW 1-4 BPOW 1-4 11/19/2018	BPOW 1-5 BPOW 1-5 4/17/2018	BPOW 1-5 BPOW 1-5 11/19/2018
	NYSDDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 1-6 BPOW 1-6 4/17/2018	BPOW 1-6 BPOW 1-6 11/19/2018	BPOW 2-1 BPOW 2-1 2/26/2018	BPOW 2-1 BPOW 2-1 4/11/2018	BPOW 2-1 BPOW 2-1 8/29/2018
	NYSDDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 2-1 BPOW 2-1 11/13/2018	BPOW 2-2 BPOW 2-2 2/26/2018	BPOW 2-2 BPOW 2-2 4/11/2018	BPOW 2-2 BPOW 2-2 9/6/2018	BPOW 2-2 BPOW 2-2 11/13/2018
	NYSDCC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 2-3 BPOW 2-3 2/26/2018	BPOW 2-3 BPOW 2-3 4/20/2018	BPOW 2-3 BPOW 2-3 9/6/2018	BPOW 2-3 BPOW 2-3 11/13/2018	BPOW 3-1 BPOW 3-1 4/12/2018
	NYSDDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 3-1 BPOW 3-1 11/15/2018	BPOW 3-2 BPOW 3-2 5/30/2018	BPOW 3-2 BPOW 3-2 11/15/2018	BPOW 3-3 BPOW 3-3 4/16/2018	BPOW 3-3 BPOW 3-3 11/15/2018
	NYSDDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 3-4 BPOW 3-4 4/16/2018	BPOW 3-4 REP041618AD1 4/16/2018	BPOW 3-4 BPOW 3-4 11/15/2018	BPOW 3-4 REP111518LV1 11/15/2018	BPOW 4-1R BPOW 4-1R 4/12/2018
	NYSDDEC SCG (ug/L) ⁽²⁾					
1,1,1-Trichloroethane	5	0.48 J	0.45 J	0.25 J	0.26 J	0.14 J
1,1,2,2-Tetrachloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	5	1.8	1.7	1.1	0.94	< 0.50
1,1-Dichloroethane	5	0.61	0.62	0.36 J	0.34 J	< 0.50
1,1-Dichloroethene	5	4.6	4.4	2.8	2.8	0.65
1,2-Dichloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50	0.20 J	< 0.50
Carbon Tetrachloride	5	3.0	3.0	1.3	1.3	0.25 J
Chlorobenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform	7	2.5	2.4	1.4	1.3	0.81
Chloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	2.4	2.3	1.7	1.7	< 0.50
cis-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50 J
Trichloroethene	5	192 D	217 D	139	131	0.34 J
Trichlorotrifluoroethane (Freon 113)	5	3.5	3.4	2.3	2.3	18.1 J
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		210	240	150	140	20

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Constituents units in (ug/L)	Well ID: Sample ID: Sample Date:	BPOW 4-1R BPOW 4-1R 11/16/2018	BPOW 4-2R BPOW 4-2R 4/19/2018	BPOW 4-2R BPOW 4-2R 11/16/2018
	NYSDDEC SCG (ug/L) ⁽²⁾			
1,1,1-Trichloroethane	5	< 0.50 J	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	5	< 0.50 J	< 0.50	< 0.50
1,1,2-Trichloroethane	5	< 0.50 J	< 0.50	< 0.50
1,1-Dichloroethane	5	< 0.50 J	< 0.50	< 0.50
1,1-Dichloroethene	5	0.77	0.33 J	0.49 J
1,2-Dichloroethane	5	< 0.50 J	< 0.50	< 0.50
1,2-Dichloropropane	5	< 0.50 J	< 0.50	< 0.50
2-Butanone (MEK)	50	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)	50	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone	50	< 2.0	< 2.0	< 2.0
Acetone	50	< 5.0	< 5.0	< 5.0
Benzene	1	< 0.50 J	< 0.50	< 0.50
Bromodichloromethane	50	< 0.50 J	< 0.50	< 0.50
Bromoform	50	< 0.50 J	< 0.50	< 0.50
Bromomethane	5	< 0.50 J	< 0.50	< 0.50
Carbon Disulfide	50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride	5	0.32 J	0.24 J	< 0.50
Chlorobenzene	5	< 0.50 J	< 0.50	< 0.50
Chloroethane	5	< 0.50	< 0.50	< 0.50
Chloroform	7	0.28 J	< 0.50	< 0.50
Chloromethane	5	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene	5	0.24 J	< 0.50	< 0.50
cis-1,3-Dichloropropene	5	< 0.50 J	< 0.50	< 0.50
Dibromochloromethane	5	< 0.50 J	< 0.50	< 0.50
Ethylbenzene	5	< 0.50 J	< 0.50	< 0.50
Methylene Chloride	5	< 0.50 J	< 0.50	< 0.50
Styrene (Monomer)	5	< 0.50 J	< 0.50	< 0.50
Tetrachloroethene	5	< 0.50 J	0.14 J	0.35 J
Toluene	5	< 0.50 J	< 0.50	< 0.50
trans-1,2-Dichloroethene	5	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	5	< 0.50 J	< 0.50	< 0.50
Trichloroethene	5	0.58 J	1.2	2.0
Trichlorotrifluoroethane (Freon 113)	5	28.1	9.0	15.9
Vinyl Chloride	2	< 0.50	< 0.50	< 0.50
o-Xylene	5	< 0.50 J	< 0.50	< 0.50
m,p-Xylene	5	< 0.50 J	< 0.50	< 0.50
TVOCs		30	11	19

Notes and abbreviations on Last Page

Table 14
 Concentrations of Volatile Organic Compounds in Groundwater Samples
 Collected From Outpost Wells ⁽¹⁾, 2018
 Operable Unit 2 Northrop Grumman Systems Corporation
 Bethpage, New York

Notes and Abbreviations:

- (1) These outpost wells have been recently repurposed for use as plume monitoring wells per the June 2015 Groundwater Monitoring Plan Addendum (ARCADIS of New York, Inc., 2015) as conditionally approved by the NYSDEC (August 25, 2015). Therefore, TVOC trigger levels that may have been previously established are no longer shown.
- (2) Standards Criteria and Guidance (SCGs) values based on the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values listed.
- (3) The NAVY abandoned original Wells BPOW4-1 and BPOW4-2 and installed replacement Wells BPOW4-1R and BPOW4-2R between August, 2014 and October, 2014.

Samples were analyzed for VOCs using USEPA Method 524.2

Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016)

TVOCs are rounded to two significant figures.

Bold value indicates constituent detected.

OU2	Operable Unit 2
SCG	Standards, Criteria and Guidance Value
NYSDEC	New York State Department of Environmental Conservation
TOGs	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
TVOCs	Total Volatile Organic Compounds (known contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)
µg/L	micrograms per liter
	Compound detected in exceedance of NYSDEC SCG Criteria
<0.5	Compound not detected above its laboratory quantification limit.
D	Value from Secondary Dilution
J	Value is estimated concentration
REP	Blind Duplicate Sample

Table 15
Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells ⁽¹⁾,
Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

Constituent (units in ug/L)	Well Id: Sample ID: Sample Date:	GM-15SR GM-15SR 6/6/2018	GM-15SR GM-15SR 10/30/2018	GM-78I GM-78I 6/21/2018	GM-78S GM-78S 6/21/2018	MW-02GF MW-2GF_20180615 6/15/2018	MW-02GF MW-2GF_20181026 10/26/2018	N-10631 N-10631 6/27/2018	N-10631 REP062718CK1 6/27/2018	N-10631 N-10631 10/25/2018
	NYSDEC SCGs (ug/L) ⁽²⁾									
Cadmium (Total)	5	--	--	<3.0	<3.0	< 3.0	< 3.0	<3.0	3.6	<3.0
Cadmium (Dissolved)	5	--	--	<3.0	<3.0	< 3.0	< 3.0	<3.0	<3.0	<3.0
Chromium (Total)	50	615	596	<10	<10	241	339	22.1	26.4	28.5
Chromium (Dissolved)	50	596	558	<10	<10	229	326	12.2	<10	<10

See Notes and Abbreviations on Last Page

Table 15
Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells ⁽¹⁾,
Operable Unit 2, Northrop Grumman Systems Corporation, Bethpage, New York.

Constituent (units in ug/L)	Well Id: Sample ID: Sample Date:	PLT1 MW-04 PLT1 MW-04 11/5/2018	PLT1 MW-05 PLT1 MW-05 7/1/2018	PLT1 MW-05 PLT1 MW-05 11/5/2018	PLT1 MW-06 PLT1 MW-06 11/5/2018	PLT1 MW-06 REP110518DC1 11/5/2018
	NYSDEC SCGs (ug/L) ⁽²⁾					
Cadmium (Total)	5	--	--	--	--	--
Cadmium (Dissolved)	5	--	--	--	--	--
Chromium (Total)	50	<10	799	610	148	150
Chromium (Dissolved)	50	<10	795	615	146	146

Notes and Abbreviations:

⁽¹⁾ Monitoring Well MW-1GF could not be sampled during 2018 due to access issues (Well was paved over). Monitoring Well MW-1GF is located upgradient of former Northrop Grumman Plant 2. Northrop Grumman will work with current property owner to resolve access issues.

⁽²⁾ Standards, Criteria, and Guidance (SCG) values based on documents referenced in the Groundwater Feasibility Study Report (ARCADIS Geraghty & Miller, Inc. 2000) that are based on the NYSDEC TOGs (NYSDEC 1998); most stringent values listed.

Samples analyzed for total unfiltered and filtered Cadmium and Chromium using USEPA Method 6010C; Total indicates unfiltered sample and Dissolved indicates filtered sample Results for the program are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016).

Bold value indicates a detection

OU2 Operable Unit 2

SCG Standards, Criteria, and Guidance

NYSDEC New York State Department of Environmental Conservation

TOGs Technical Operational and Guidance Series

USEPA United States Environmental Protection Agency

µg/L Micrograms per liter

[Redacted] Compound detected in exceedance of NYSDEC SCG Criteria

< 3.0 Compound not detected above its laboratory quantification limit

REP Blind Duplicate Sample

Table 16
 Concentrations of 1,4-Dioxane in Groundwater Samples
 Collected From Monitoring Wells and Remedial Wells,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York.

Well ID	Sample ID	Sample Date	1,4-Dioxane (ug/L)	Hydrogeologic Zones
FW-03	FW-03	10/29/2018	1.1	Shallow
GM-13D	GM-13D	6/13/2018	3.0	Intermediate
GM-15SR	GM-15SR	6/6/2018	0.50	Shallow
GM-15SR	GM-15SR	10/30/2018	<0.29 B	Shallow
GM-15I	GM-15I	6/6/2018	0.18 J	Shallow
GM-15I	GM-15I	10/30/2018	<0.25 BJ	Shallow
GM-15D	GM-15D	6/6/2018	<0.17	Deep
GM-15D	GM-15D	10/30/2018	<0.24 B	Deep
GM-15D2	GM-15D2	6/6/2018	3.8	Deep 2
GM-15D2	GM-15D2	10/30/2018	4.0	Deep 2
GM-17I	GM-17I	10/26/2018	7.3	Shallow
GM-17D	GM-17D	6/8/2018	7.8	Deep
GM-17D	GM-17D	10/26/2018	7.7	Deep
GM-18I	GM-18I	11/8/2018	5.3	Shallow
GM-18D	GM-18D	6/19/2018	12	Deep
GM-18D	GM-18D	10/18/2018	14	Deep
GM-20I	GM-20I	6/28/2018	5.8	Shallow
GM-20D	GM-20D	6/28/2018	5.1	Deep
GM-21S	GM-21S	6/22/2018	4.2	Shallow
GM-21I	GM-21I	6/27/2018	6.5	Shallow
GM-21D	GM-21D	6/18/2018	4.6	Deep
GM-21D2	GM-21D2	6/14/2018	5.2	Deep 2
GM-21D2	GM-21D2	10/22/2018	5.1	Deep 2
GM-33D2	GM-33D2	6/13/2018	14	Deep 2
GM-33D2	GM-33D2	10/24/2018	11	Deep 2
GM-34D	GM-34D	10/31/2018	14	Deep
GM-34D2	GM-34D2	6/7/2018	13	Deep 2
GM-34D2	GM-34D2	10/31/2018	11	Deep 2
GM-35D2	GM-35D2	6/8/2018	8.3	Deep 2
GM-35D2	GM-35D2	10/23/2018	8.4	Deep 2
GM-35D2	REP102318DC1	10/23/2018	8.7	Deep 2
GM-36D	GM-36D	6/26/2018	1.7	Deep
GM-36D2	GM-36D2	6/26/2018	4.2	Deep 2
GM-37D	GM-37D	6/29/2018	0.77	Deep
GM-37D2	GM-37D2	6/29/2018	0.83	Deep
GM-38D	GM-38D	6/7/2018	4.5	Deep
GM-38D	GM-38D	10/23/2018	4.0	Deep
GM-38D2	GM-38D2	6/7/2018	3.9	Deep 2
GM-38D2	GM-38D2	10/23/2018	3.6	Deep 2
GM-39DA	GM-39DA	6/28/2018	5.2	Deep
GM-39DA	GM-39DA	10/19/2018	4.7	Deep
GM-39DB	GM-39DB	6/28/2018	3.9	Deep
GM-39DB	GM-39DB	10/19/2018	3.6	Deep

See Notes and Abbreviations on Last Page

Table 16
 Concentrations of 1,4-Dioxane in Groundwater Samples
 Collected From Monitoring Wells and Remedial Wells,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York.

Well ID	Sample ID	Sample Date	1,4-Dioxane (ug/L)	Hydrogeologic Zones
GM-70D2	GM-70D2	6/27/2018	7.9	Deep
GM-71D2	GM-71D2	6/15/2018	2.2	Deep 2
GM-73D	GM-73D	6/5/2018	4.9	Deep
GM-73D	GM-73D	11/2/2018	3.7	Deep
GM-73D2	GM-73D2	6/5/2018	3.3	Deep 2
GM-73D2	GM-73D2	11/2/2018	4.4	Deep 2
GM-73D3	GM-73D3	6/25/2018	0.94	Deep 2
GM-73D3	GM-73D3	11/2/2018	0.94	Deep 2
GM-74I	GM-74I	6/5/2018	5.3	Shallow
GM-74I	GM-74I	11/1/2018	4.7	Shallow
GM-74D	GM-74D	6/5/2018	5.3	Deep
GM-74D	GM-74D	11/1/2018	6.8	Deep
GM-74D2	GM-74D2	6/5/2018	3.4	Deep 2
GM-74D2	GM-74D2	11/1/2018	4.0	Deep 2
GM-74D3	GM-74D3	6/22/2018	1.9	Deep 2
GM-74D3	GM-74D3	11/1/2018	2.8	Deep 2
GM-75D2	GM-75D2	6/13/2018	8.8	Deep 2
GM-75D2	GM-75D2	10/24/2018	5.6 J	Deep 2
GM-78S	GM-78S	6/21/2018	3.7	Shallow
GM-78I	GM-78I	6/21/2018	3.6	Shallow
GM-78D	GM-78D	6/26/2018	11	Deep
GM-78D	GM-78D	10/24/2018	9.3 J	Deep
GM-78D2	GM-78D2	6/26/2018	14	Deep 2
GM-78D2	GM-78D2	10/24/2018	9.9 J	Deep 2
GM-79I	GM-79I	10/31/2018	5.6	Intermediate
GM-79D	GM-79D	6/18/2018	6.2	Deep
GM-79D	GM-79D	10/31/2018	7.0	Deep
HN-24I	HN-24I	10/29/2018	2.0	Intermediate
HN-40S	HN-40S	6/20/2018	<0.24	Shallow
HN-40I	HN-40I	6/20/2018	<0.24	Shallow
HN-42S	HN-42S	6/19/2018	<0.24	Shallow
HN-42I	HN-42I	6/19/2018	0.52	Shallow
MW-01GF	MW-01GF	NA ⁽¹⁾	NA ⁽¹⁾	Shallow
MW-01GF	MW-01GF	NA ⁽¹⁾	NA ⁽¹⁾	Shallow
MW-02GF	MW-02GF	6/15/2018	38	Shallow
MW-02GF	MW-02GF	10/26/2018	18	Shallow
MW 3-1	MW 3-1	6/11/2018	17	Deep 2
MW 3-1	MW 3-1	10/29/2018	10	Deep 2
N-10624	N-10624	6/27/2018	4.6	Intermediate
N-10627	N-10627	6/27/2018	5.2	Deep
N-10631	N-10631	6/27/2018	5.6	Shallow
N-10631	REP062718CK1	6/27/2018	4.6	Shallow
N-10631	N-10631	10/25/2018	4.4	Shallow

See Notes and Abbreviations on Last Page

Table 16
 Concentrations of 1,4-Dioxane in Groundwater Samples
 Collected From Monitoring Wells and Remedial Wells,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York.

Well ID	Sample ID	Sample Date	1,4-Dioxane (ug/L)	Hydrogeologic Zones
PLT1 MW-04	PLT1 MW-04	11/5/2018	0.16 J	Shallow
PLT1 MW-05	PLT1 MW-05	11/5/2018	<0.24	Shallow
PLT1 MW-06	PLT1 MW-06	11/5/2018	<0.24	Shallow
PLT1 MW-06	REP110518DC1	11/5/2018	<0.24	Shallow
BPOW 1-1	BPOW 1-1	4/13/2018	<0.200	Deep
BPOW 1-1	BPOW 1-1	11/14/2018	<0.200	Deep
BPOW 1-2	BPOW 1-2	4/13/2018	0.431	Deep
BPOW 1-2	BPOW 1-2	11/14/2018	<0.200	Deep
BPOW 1-3	BPOW 1-3	4/12/2018	0.516	Deep
BPOW 1-3	BPOW 1-3	11/14/2018	0.179	Deep
BPOW 1-4	BPOW 1-4	4/17/2018	0.136	Deep
BPOW 1-4	BPOW 1-4	11/19/2018	<0.200	Deep
BPOW 1-5	BPOW 1-5	4/17/2018	0.139	Deep 2
BPOW 1-5	BPOW 1-5	11/19/2018	<0.200	Deep 2
BPOW 1-6	BPOW 1-6	4/17/2018	0.114	Deep 2
BPOW 1-6	BPOW 1-6	11/19/2018	<0.200	Deep 2
BPOW 2-1	BPOW 2-1	2/26/2018	2.60	Deep
BPOW 2-1	BPOW 2-1	4/11/2018	0.886	Deep
BPOW 2-1	BPOW 2-1	8/29/2018	2.14	Deep
BPOW 2-1	BPOW 2-1	11/13/2018	0.389	Deep
BPOW 2-2	BPOW 2-2	2/26/2018	0.510	Deep 2
BPOW 2-2	BPOW 2-2	4/11/2018	0.447	Deep 2
BPOW 2-2	BPOW 2-2	9/6/2018	0.430	Deep 2
BPOW 2-2	BPOW 2-2	11/13/2018	0.374	Deep 2
BPOW 2-3	BPOW 2-3	2/26/2018	4.88	Deep 2
BPOW 2-3	BPOW 2-3	4/20/2018	3.14	Deep 2
BPOW 2-3	BPOW 2-3	9/6/2018	4.27	Deep 2
BPOW 2-3	BPOW 2-3	11/13/2018	4.4	Deep 2
BPOW 3-1	BPOW 3-1	4/12/2018	1.09	Deep 2
BPOW 3-1	BPOW 3-1	11/15/2018	0.796	Deep 2
BPOW 3-2	BPOW 3-2	5/30/2018	3.33	Deep 2
BPOW 3-2	BPOW 3-2	11/15/2018	3.35	Deep 2
BPOW 3-3	BPOW 3-3	4/16/2018	5.87	Deep 2
BPOW 3-3	BPOW 3-3	11/15/2018	5.74	Deep 2
BPOW 3-4	BPOW 3-4	4/16/2018	6.08	Deep 2
BPOW 3-4	REP041618AD1	4/16/2018	6.11	Deep 2
BPOW 3-4	BPOW 3-4	11/15/2018	4.43	Deep 2
BPOW 3-4	REP111518LV1	11/15/2018	4.29	Deep 2
BPOW 4-1R ⁽²⁾	BPOW 4-1R	4/12/2018	2.84	Deep 2
BPOW 4-1R ⁽²⁾	BPOW 4-1R	11/16/2018	3.12	Deep 2
BPOW 4-2R ⁽²⁾	BPOW 4-2R	4/19/2018	0.741	Deep 3
BPOW 4-2R ⁽²⁾	BPOW 4-2R	11/16/2018	1.47	Deep 3
Well 1	Well 1	2/28/2018	10.2	Deep 2

See Notes and Abbreviations on Last Page

Table 16
 Concentrations of 1,4-Dioxane in Groundwater Samples
 Collected From Monitoring Wells and Remedial Wells,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York.

Well ID	Sample ID	Sample Date	1,4-Dioxane (ug/L)	Hydrogeologic Zones
Well 1	Well 1	5/10/2018	10.4	Deep 2
Well 1	Well 1	9/5/2018	6.4	Deep 2
Well 1	Well 1	12/6/2018	9.4	Deep 2
Well 3R	Well 3R	2/28/2018	15.0	Deep 2
Well 3R	Well 3R	5/10/2018	15.0	Deep 2
Well 3R	Well 3R	9/5/2018	11	Deep 2
Well 3R	Well 3R	12/6/2018	13	Deep 2
Well 17	Well 17	2/28/2018	8.85	Deep 2
Well 17	REP-022818-JJC-1	2/28/2018	9.12	Deep 2
Well 17	Well 17	5/10/2018	9.48	Deep 2
Well 17	Well 17	9/5/2018	4.8	Deep 2
Well 17	Well 17	12/6/2018	8.6	Deep 2
Well 18	WELL 18	2/28/2018	6.89	Deep 2
Well 18	WELL 18	5/10/2018	7.73	Deep 2
Well 18	WELL 18	9/5/2018	4.9	Deep 2
Well 18	WELL 18	12/6/2018	5.9	Deep 2
Well 18	REP-120618-JJC-1	12/6/2018	6.2	Deep 2
Well 19	Well 19	2/28/2018	6.05	Deep 2
Well 19	Well 19	5/10/2018	7.08	Deep 2
Well 19	REP-051018-SC-1	5/10/2018	5.60	Deep 2
Well 19	Well 19	9/5/2018	4.4	Deep 2
Well 19	Well 19	12/6/2018	4.6	Deep 2

Notes and Abbreviations:

- (1) MW-1GF could not be sampled due to accessibility issues (well location was paved over)
 Monitoring well MW-1GF is located upgradient of former Northrop Grumman Plant 2. Northrop Grumman will work with current property owner to resolve access issues.
 (2) The NAVY abandoned original Wells BPOW4-1 and BPOW4-2 and installed replacement Wells BPOW4-1R and BPOW4-2R between August, 2014 and October, 2014.

Results are validated at 20% frequency, per protocols specified in OU2 Groundwater Monitoring Plan
 Samples were analyzed for 1,4-Dioxane using USEPA Method 8270D SIM except for outpost wells (BPOW designation in Well ID) which were analyzed using USEPA Method 522.

Bold value indicates constituent detected.

OU2	Operable Unit 2
USEPA	United States Environmental Protection Agency
µg/L	micrograms per liter
< 0.20	Compound not detected above its laboratory quantification limit.
J	Value is estimated concentration
SIM	Selective Ion Monitoring
REP	Blind Duplicate Sample

Table 17
 Comparison of Fourth Quarter Field Measured
 2018 Vertical Hydraulic Gradients
 to Model-Predicted Gradients, Operable Unit 2,
 Northrop Grumman Systems Corporation,
 Bethpage, New York

Well ID	Well Screen Midpoint Elevation (ft msl)	Water-Level Elevation (ft msl)	Field-Measured Vertical Gradient ⁽¹⁾ (ft/ft) x 10 ⁻³	Model-Predicted, OU2 Steady-State Vertical Gradient ⁽²⁾ (ft/ft) x 10 ⁻³	Change Compared to Model-Predicted, Steady-State Vertical Gradient ⁽⁴⁾
Shallow-Shallow Wells⁽³⁾					
GM-17SR	50.79	73.39			
GM-17I	5.83	73.28	2.45	0.77	1.68
GM-78S	39.94	62.92			
GM-78I	5.56	62.70	6.40	0.91	5.49
GM-19S	59.36	63.69			
GM-19I	-25.14	63.51	2.13	3.61	-1.48
GM-21S	40.81	63.48			
GM-21I	-29.28	63.00	6.85	8.84	-1.99
Shallow-Deep Wells⁽³⁾					
GM-17I	5.83	73.28			
GM-17D	-172.32	66.40	38.62	38.90	-0.28
GM-18I	9.03	66.27			
GM-18D	-186.12	62.77	17.93	22.68	-4.75
GM-20I	3.88	64.75			
GM-20D	-117.08	63.05	14.05	38.17	-24.12
GM-74I	8.42	62.62			
GM-74D	-192.57	60.19	12.09	36.40	-24.31
GM-21I	-29.28	63.00			
GM-21D	-177.34	60.46	17.16	32.48	-15.32
Deep-Deep Wells⁽³⁾					
GM-39D _A	-169.77	62.02			
GM-39D _B	-312.92	59.35	18.65	27.22	-8.57
Deep-Deep 2 Wells⁽³⁾					
GM-15D	-227.34	60.73			
GM-15D2	-436.20	58.75	9.48	10.07	-0.59
GM-18D	-186.12	62.77			
GM-33D2	-403.15	56.94	26.86	31.59	-4.73
GM-21D	-177.34	60.46			
GM-21D2	-416.60	55.05	22.61	24.87	-2.26
GM-74D	-192.57	60.19			
GM-74D2	-444.64	54.22	23.68	20.86	2.82
GM-73D	-301.13	59.65			
GM-73D2	-437.38	57.68	14.46	14.74	-0.28
GM-73D	-301.13	59.65			
GM-73D3	-537.86	56.73	12.33	8.48	3.85

See Notes and Abbreviations on Last Page

Table 17
Comparison of Fourth Quarter Field Measured
2018 Vertical Hydraulic Gradients
to Model-Predicted Gradients, Operable Unit 2,
Northrop Grumman Systems Corporation,
Bethpage, New York

Well ID	Well Screen Midpoint Elevation (ft msl)	Water-Level Elevation (ft msl)	Field-Measured Vertical Gradient ⁽¹⁾ (ft/ft) x 10 ⁻³	Model-Predicted, OU2 Steady-State Vertical Gradient ⁽²⁾ (ft/ft) x 10 ⁻³	Change Compared to Model-Predicted, Steady-State Vertical Gradient ⁽⁴⁾
Deep 2-Deep 2 Wells⁽³⁾					
GM-74D2	-444.64	54.22			
GM-74D3	-527.42	55.71	-18.00	-18.25	-0.25

Notes and Abbreviations:

(1) Vertical hydraulic gradients are calculated as follows:

$$\frac{(\text{Water-Level Elevation}_1 - \text{Water-Level Elevation}_2)}{(\text{Screen Midpoint Elevation}_1 - \text{Screen Midpoint Elevation}_2)}$$

$$= \frac{1}{(\text{Screen Midpoint Elevation}_1 - \text{Screen Midpoint Elevation}_2)}$$

₁ - Shallower well of pairing

₂ - Deeper well of pairing

A positive gradient value indicates a downward hydraulic gradient.

A negative "-" gradient value indicates an upward hydraulic gradient.

(2) The updated 2018 model was used to calculate the Steady State Vertical Gradients.

(3) Well identification (e.g., GM-73D) does not necessarily designate the actual hydrogeologic zone.

Determination of the hydrogeologic zone is based on the well screen interval and the regional 2018 model layering.

(4) A positive change indicates field measured gradient is greater than predicted by model.

A negative change indicates field measured gradient is less than predicted by model.

ft msl feet relative to mean sea level

OU2 Operable Unit 2

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB053018DC1 5/30/2018	FB060618PP1 6/6/2018	FB060718PP1 6/7/2018	FB061118AD1 6/11/2018	FB061418CK1 6/14/2018	FB061518CK1 6/15/2018
	Analytical Method:	VOC: 1,4-Dioxane:	524.2 522	8260 8270D SIM	8260 8270D SIM	8260 8270D SIM	8260 8270D SIM
1,1,1-Trichloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,1,2,2-Tetrachloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,1,2-Trichloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,1-Dichloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,1-Dichloroethene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,2-Dichloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
1,2-Dichloropropane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
2-Butanone (MEK)		< 5.0	< 10	< 10	< 10	< 10	--
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 5.0	< 5.0	< 5.0	< 5.0	--
4-Methyl-2-Pentanone		< 2.0	< 5.0	< 5.0	< 5.0	< 5.0	--
Acetone		4.1 J	< 10	< 10	< 10	< 10	--
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	--
Bromodichloromethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Bromoform		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Bromomethane		< 0.50	< 2.0	< 2.0	< 2.0	< 2.0	--
Carbon Disulfide		< 0.50	< 2.0	< 2.0	< 2.0	< 2.0	--
Carbon Tetrachloride		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Chlorobenzene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Chloroethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Chloroform		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Chloromethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
cis-1,2-Dichloroethene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
cis-1,3-Dichloropropene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Dibromochloromethane		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Ethylbenzene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Methylene Chloride		< 0.50	< 2.0	< 2.0	< 2.0	< 2.0	--
Styrene (Monomer)		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Tetrachloroethene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Toluene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
trans-1,2-Dichloroethene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
trans-1,3-Dichloropropene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Trichloroethene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
Trichlorotrifluoroethane (Freon 113)		< 1.0	< 5.0	< 5.0	< 5.0	< 5.0	--
Vinyl Chloride		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
o-Xylene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
m,p-Xylene		< 0.50	< 1.0	< 1.0	< 1.0	< 1.0	--
TVOCs		0	0	0	0	0	—
1,4-Dioxane		< 0.200	< 0.17	< 0.24	< 0.24	< 0.24	< 0.24

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB061918PP1 6/19/2018	FB062018PP1 6/20/2018	FB062118PP1 6/21/2018	FB062218DC1 6/22/2018	FB062218PP1 6/22/2018	FB062518DC1 6/25/2018
	Analytical Method:	VOC: 1,4-Dioxane:	8260 8270D SIM				
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		< 0.24	< 0.27	< 0.25	< 0.24	< 0.24	< 0.24

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB062618AD1 6/26/2018	FB062718AD1 6/27/2018	FB062718CK1 6/27/2018	FB062918AD1 6/29/2018	FB070118PP1 7/1/2018	FB071318DC1 7/13/2018
	Analytical Method:	VOC: 1,4-Dioxane:	8260 8270D SIM	8260 8270D SIM	8260 8270D SIM	8260 8270D SIM	-- 8270D SIM
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	--	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	--	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	--	< 5.0
Acetone		< 10	< 10	< 10	< 10	--	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	--	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	--	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
TVOCs		0	0	0	0	--	0
1,4-Dioxane		< 0.24	< 0.24	< 0.24	< 0.24	< 0.24	< 0.17

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB080818DC1 8/8/2018	FB102218DC1 10/22/2018	FB102318DC1 10/23/2018	FB102418DC1 10/24/2018	FB102518DC1 10/25/2018	FB102618CK1 10/26/2018
	Analytical Method:	VOC: 1,4-Dioxane:	8260 8270D SIM				
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		< 0.24	< 0.24	< 0.24	< 0.25	< 0.25	< 0.25

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB102618DC1 10/26/2018	FB102918CK1 10/29/2018	FB102918DC1 10/29/2018	FB103018CK1 10/30/2018	FB103018DC1 10/30/2018	FB110118CK1 11/1/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260 8270D SIM	8260 8270D SIM				
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		< 0.26	< 0.26	< 0.25	< 0.26	< 0.26	< 0.26

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	FB110218CK1 11/2/2018	FB110518DC1 11/5/2018	FB111518DC1 11/15/2018	TB022618PP1 2/26/2018	TB-022818-JJC-1 2/28/2018	TB030618PP1 3/6/2018
	Analytical Method:	VOC: 1,4-Dioxane:	8260 8270D SIM	-- 8270D SIM	524.2 522	524.2 --	8260 --
1,1,1-Trichloroethane		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
1,1,2-Trichloroethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
1,1-Dichloroethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
1,1-Dichloroethene		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
1,2-Dichloropropane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
2-Butanone (MEK)		< 10	--	< 5.0	< 5.0	< 10	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	--	< 2.0	< 2.0	< 5.0	< 2.0
4-Methyl-2-Pentanone		< 5.0	--	< 2.0	< 2.0	< 5.0	< 2.0
Acetone		< 10	--	< 5.0	< 5.0	< 10	< 5.0
Benzene		< 0.50	--	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Bromoform		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Bromomethane		< 2.0	--	< 0.50	< 0.50	< 2.0	< 0.50
Carbon Disulfide		< 2.0	--	< 0.50	< 0.50	< 2.0	< 0.50
Carbon Tetrachloride		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Chlorobenzene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Chloroethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Chloroform		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
cis-1,2-Dichloroethene		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Dibromochloromethane		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Ethylbenzene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Methylene Chloride		< 2.0	--	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Tetrachloroethene		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
Toluene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
trans-1,2-Dichloroethene		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
Trichloroethene		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)		< 5.0	--	< 1.0	< 1.0	< 0.50	< 1.0
Vinyl Chloride		< 1.0	--	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
m,p-Xylene		< 1.0	--	< 0.50	< 0.50	< 1.0	< 0.50
TVOCs		0	--	0	0	0	0
1,4-Dioxane		< 0.25	< 0.25	< 0.200	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB030618PP1 3/6/2018	TB041118AD1 4/11/2018	TB041218AD1 4/12/2018	TB041218PP1 4/12/2018	TB041318DC1 4/13/2018	TB041618DC1 4/16/2018
	Analytical Method: VOC: 1,4-Dioxane:	524.2	524.2	524.2	524.2	524.2	524.2
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB041718A01 4/17/2018	TB041918AD1 4/19/2018	TB042018AD1 4/20/2018	TB-051018-SC-1 5/10/2018	TB053018DC1 5/30/2018	TB060518PP1 6/5/2018
	Analytical Method: VOC: 1,4-Dioxane:	524.2	524.2	524.2	8260	524.2	8260
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0	< 5.0	< 2.0	< 5.0
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 5.0	< 2.0	< 5.0
Acetone		< 5.0	< 5.0	< 5.0	< 10	< 5.0	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Bromoform		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Bromomethane		< 0.50	< 0.50	< 0.50	< 2.0	< 0.50	< 2.0
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 2.0	< 0.50	< 2.0
Carbon Tetrachloride		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Chloroethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Chloroform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
Chloromethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Dibromochloromethane		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Methylene Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 2.0
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
Toluene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
Trichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 5.0
Vinyl Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 1.0
o-Xylene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
m,p-Xylene		< 0.50	< 0.50	< 0.50	< 1.0	< 0.50	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB060618PC1 6/6/2018	TB060718DC1 6/7/2018	TB060818DC1 6/8/2018	TB060818PP1 6/8/2018	TB061118AD1 6/11/2018	TB061318AR1 6/13/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB061418CK1 6/14/2018	TB061518AR1 6/15/2018	TB061818PP1 6/18/2018	TB061918AR1 6/19/2018	TB061918PP1 6/19/2018	TB062018PP1 6/20/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB062118PP1 6/21/2018	TB062218DC1 6/22/2018	TB062218PP1 6/22/2018	TB062518DC1 6/25/2018	TB062618CK1 6/26/2018	TB062718CK1 6/27/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB062818AD1 6/28/2018	TB062818CK1 6/28/2018	TB062918AD1 6/29/2018	TB0626218AD1 6/26/2018	TB06262718AD1 6/27/2018	TB070218AD1 7/2/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB070518AD1 7/5/2018	TB071318DC1 7/13/2018	TB080818DC1 8/8/2018	TB090618DC1 9/6/2018	TB101818DC1 10/18/2018	TB101918DC1 10/19/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260 —	8260 —	8260 —	524.2 —	8260 —	8260 —
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 5.0	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 2.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 2.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 5.0	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 0.50	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 0.50	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 0.50	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB102218DC1 10/22/2018	TB102318DC1 10/23/2018	TB102418CK1 10/24/2018	TB102418DC1 10/24/2018	TB102518DC1 10/25/2018	TB102618CK1 10/26/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260 —	8260 —	8260 —	8260 —	8260 —	8260 —
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB102618DC1 10/26/2018	TB102918CK1 10/29/2018	TB102918DC1 10/29/2018	TB103018CK1 10/30/2018	TB103018DC1 10/30/2018	TB103118DC1 10/31/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB103118CK1 10/31/2018	TB110118CK1 11/1/2018	TB110218CK1 11/2/2018	TB110718DC1 11/7/2018	TB110818DC 11/8/2018	TB111318ALH1 11/13/2018
	Analytical Method: VOC: 1,4-Dioxane:	8260	8260	8260	8260	8260	8260
1,1,1-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (MEK)		< 10	< 10	< 10	< 10	< 10	< 10
Methyl N-Butyl Ketone (2-Hexanone)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Methyl-2-Pentanone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone		< 10	< 10	< 10	< 10	< 10	< 10
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Styrene (Monomer)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorotrifluoroethane (Freon 113)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
 Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in g/L)	Sample ID: Sample Date:	TB111318ALH1 11/13/2018	TB111518DC1 11/15/2018	TB111518LV1 11/15/2018	TB111618ALH1 11/16/2018	TB111918DC1 11/19/2018	TB11418PP1 11/14/2018
	Analytical Method: VOC: 1,4-Dioxane:	524.2	524.2	524.2	524.2	524.2	524.2
1,1,1-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (MEK)		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl N-Butyl Ketone (2-Hexanone)		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Methyl-2-Pentanone		< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Acetone		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Disulfide		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon Tetrachloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chlorobenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dibromochloromethane		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Ethylbenzene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Styrene (Monomer)		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichloroethene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorotrifluoroethane (Freon 113)		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
o-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
m,p-Xylene		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
TVOCs		0	0	0	0	0	0
1,4-Dioxane		--	--	--	--	--	--

See Notes and Abbreviations on Last Page

Table 18A
Concentrations of Volatile Organic Compounds and 1,4-Dioxane in Blank Samples,
Operable Unit 2, Northrop Grumman Systems Corporation,
Bethpage, New York



Notes and Abbreviations

Results validated following protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016c).

Above analyte list represents aggregation of all VOCs analyzed for using the laboratory methods specified herein.

Total VOCs rounded to two significant figures.

Bold indicates constituent detected

OU2 Operable Unit 2

USEPA United States Environmental Protection Agency

VOCs Volatile Organic Compounds

TVOCs Total Volatile Organic Compounds (known lab contaminants acetone, 2-butanone, and methylene chloride are not included in calculation of TVOCs)

µg/L micrograms per liter

< 0.50 Compound not detected above its laboratory quantification limit.

J Value is estimated concentration

SIM Selective Ion Monitoring

TB Trip Blank

FB Field Blank

-- Not analyzed

Table 18B
 Concentrations of Metals in Blank Samples,
 Operable Unit 2, Northrop Grumman Systems Corporation,
 Bethpage, New York

Constituents (units in ug/L)	Sample ID:	FB060618PP1 6/6/2018	FB061518CK1 6/15/2018	FB062118PP1 6/21/2018	FB070118PP1 7/1/2018	FB080818DC1 8/8/2018	FB102518DC1 10/25/2018	FB102618CK1 10/26/2018	FB103018DC1 10/30/2018	FB110518DC1 11/5/2018
Cadmium (Total)		< 3.0	< 3.0	< 3.0	--	< 3.0	< 3.0	< 3.0	--	--
Chromium (Total)		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10

Notes and Abbreviations

Sample analyzed for Metals using USEPA Method 6010CC. Total indicates samples are unfiltered.

Results validated following protocols specified in OU2 Groundwater Monitoring Plan (Arcadis 2016c).

µg/L micrograms per liter

USEPA United States Environmental Protection Agency

-- Not analyzed.

FB Field Blank

< 3.0 Compound not detected above its laboratory quantification limit.

OU2 Operable Unit 2

Table 19.
Scope and Rationale for 2019 Suggested Modifications to the
Operable Unit 2 Groundwater Monitoring Plan,
Northrop Grumman Systems Corporation Site,
Bethpage, New York. (1)

Well Identification ⁽²⁾	Current Approved Groundwater Sampling Frequency	Suggested Groundwater Sampling Frequency	Rationale for Suggested Monitoring Frequency	Related Trend Graphs
FW-03	Annual	No Change		
MW3-1	Semiannual	No Change		
GM-13D	Annual	Biennial	Definable trend and minimal variation in concentrations from one sampling event to the next	Figure 18
HN-24I	Annual	Biennial	Definable trend and minimal variation in concentrations from one sampling event to the next	Figure 18
HN-40S	Annual	No change		
HN-40I	Annual	No change		
HN-42S	Annual	No change		
HN-42I	Annual	No change		
MW-1GF	Semiannual	No Change		
MW-2GF	Semiannual	Quarterly	Based on the increasing trend in the last few years	Figure 28
GM-21S	Annual	No change		
GM-21I	Annual	No change		
GM-21D	Annual	No change		
GM-21D2	Quarterly	No Change		
GM-33D2	Semi-Annual	No Change		
GM-79I	Semi-Annual	No Change		
GM-79D	Semi-Annual	No Change		
GM-20I	Annual	No Change		
GM-20D	Annual	No Change		
GM-15SR	Semi-Annual	No Change		
GM-15I	Semi-Annual	No Change		
GM-15D	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 8
GM-15D2	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 8
GM-17I	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-17D	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-18I	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-18D	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-39D _A	Semi-Annual	No Change		
GM-39D _B	Semi-Annual	No Change		
GM-73D	Semi-Annual	No Change		
GM-73D2	Semi-Annual	No Change		
GM-73D3	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-74I	Semi-Annual	No Change		

See Notes and Abbreviations on Last Page.

Table 19.
Scope and Rationale for 2019 Suggested Modifications to the
Operable Unit 2 Groundwater Monitoring Plan,
Northrop Grumman Systems Corporation Site,
Bethpage, New York. (1)

Well Identification ⁽²⁾	Current Approved Groundwater Sampling Frequency	Suggested Groundwater Sampling Frequency	Rationale for Suggested Monitoring Frequency	Related Trend Graphs
GM-74D	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 8
GM-74D2	Semi-Annual	No Change		
GM-74D3	Semi-Annual	No Change		
PLT1MW-04	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 29
PLT1MW-05	Semi-Annual	No Change		
PLT1MW-06	Semi-Annual	No Change		
Well 1	Quarterly	No Change		
Well 3R	Quarterly	No Change		
Well 17	Quarterly	No Change		
Well 18	Quarterly	No Change		
Well 19	Quarterly	No Change		
GM-75D2	Quarterly	No Change		
GM-34D	Semi-Annual	No Change		
GM-34D2	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 21
GM-35D2	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 21
N-10631	Semi-Annual	No Change		
GM-36D	Annual	Biennial	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 19
GM-36D2	Annual	Biennial	Definable trend and minimal variation in concentrations from one sampling event to the next.	Figure 20
GM-37D	Annual	No Change		
GM-37D2	Annual	No Change		
GM-38D	Semi-Annual	No Change		
GM-38D2	Semi-Annual	No Change		
GM-70D2	Annual	No Change		
GM-71D2	Annual	No Change		
GM-78S	Annual	No Change		
GM-78I	Annual	No Change		
GM-78D	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
GM-78D2	Semi-Annual	Annual	Definable trend and minimal variation in concentrations from one sampling event to the next.	Appendix F
N-10624	Annual	No Change		
N-10627	Annual	No Change		
BPOW1-1	Semi-Annual	No Change		
BPOW1-2	Semi-Annual	No Change		
BPOW1-3	Semi-Annual	No Change		

See Notes and Abbreviations on Last Page.

Table 19.
Scope and Rationale for 2019 Suggested Modifications to the
Operable Unit 2 Groundwater Monitoring Plan,
Northrop Grumman Systems Corporation Site,
Bethpage, New York. (1)

Well Identification ⁽²⁾	Current Approved Groundwater Sampling Frequency	Suggested Groundwater Sampling Frequency	Rationale for Suggested Monitoring Frequency	Related Trend Graphs
BPOW1-4	Semi-Annual	No Change		
BPOW1-5	Semi-Annual	No Change		
BPOW1-6	Semi-Annual	No Change		
BPOW2-1	Quarterly	No Change		
BPOW2-2	Quarterly	No Change		
BPOW2-3	Quarterly	No Change		
BPOW3-1	Semi-Annual	No Change		
BPOW3-2	Semi-Annual	No Change		
BPOW3-3	Semi-Annual	No Change		
BPOW3-4	Semi-Annual	No Change		
BPOW4-1R	Semi-Annual	No Change		
BPOW4-2R	Semi-Annual	No Change		

Notes and Abbreviations

⁽¹⁾ Suggested modifications will be incorporated into the OU2 Groundwater Monitoring Plan Addendum. This plan will be implemented upon NYSDEC approval.

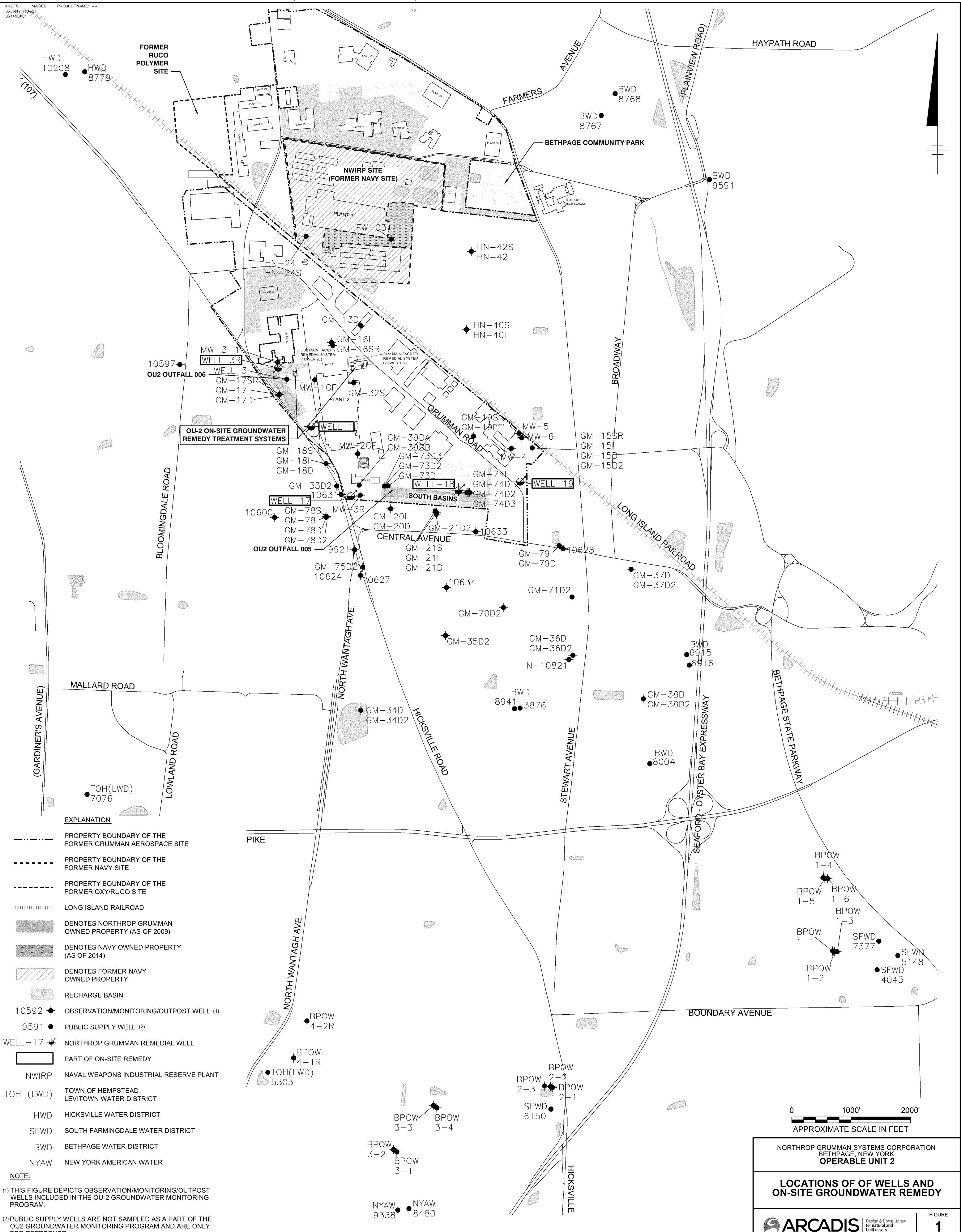
These modifications will also be incorporated into the OU2 Operation, Maintenance, and Monitoring Plan via the OU2 Groundwater Monitoring Plan Addendum, associated changes to the Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) as needed.

⁽²⁾ See Figure 1 for locations of wells.

OU2 Operable Unit 2 for Northrop Grumman Systems Corporation/Naval Weapons Industrial Reserve Plant Sites (NYSDEC Sites #1-30-003A and B, respectively).
NYSDEC New York State Department of Environmental Conservation

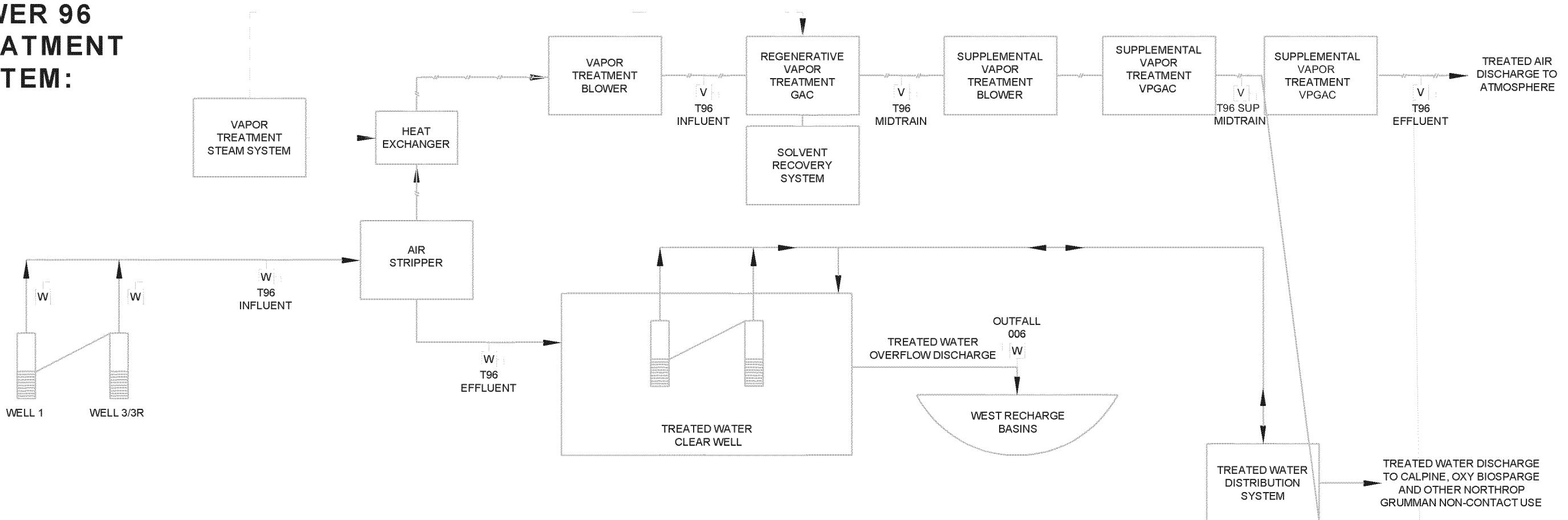
FIGURES



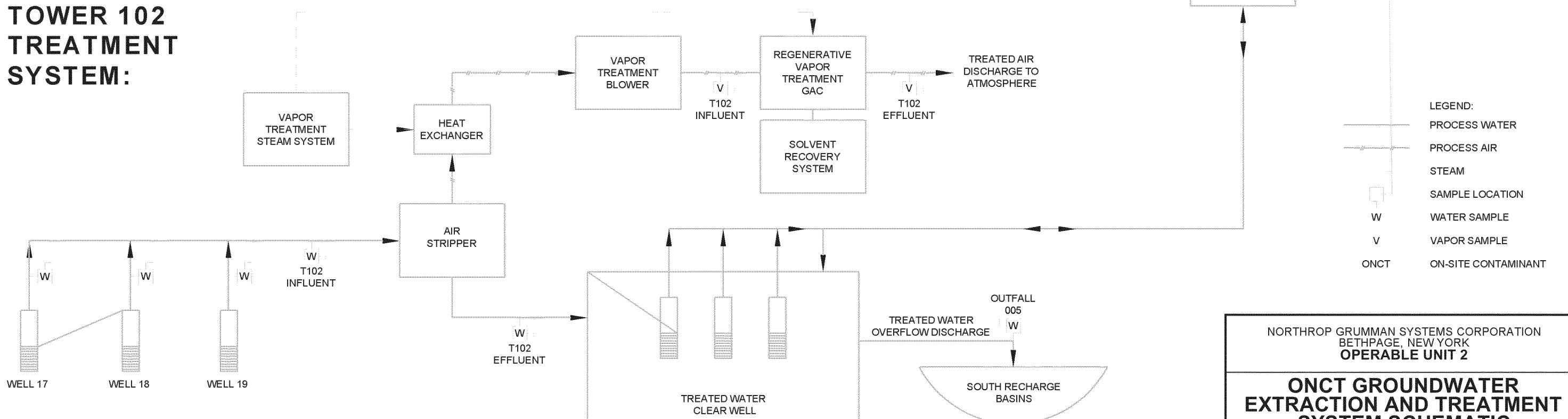




TOWER 96 TREATMENT SYSTEM:



TOWER 102 TREATMENT SYSTEM:

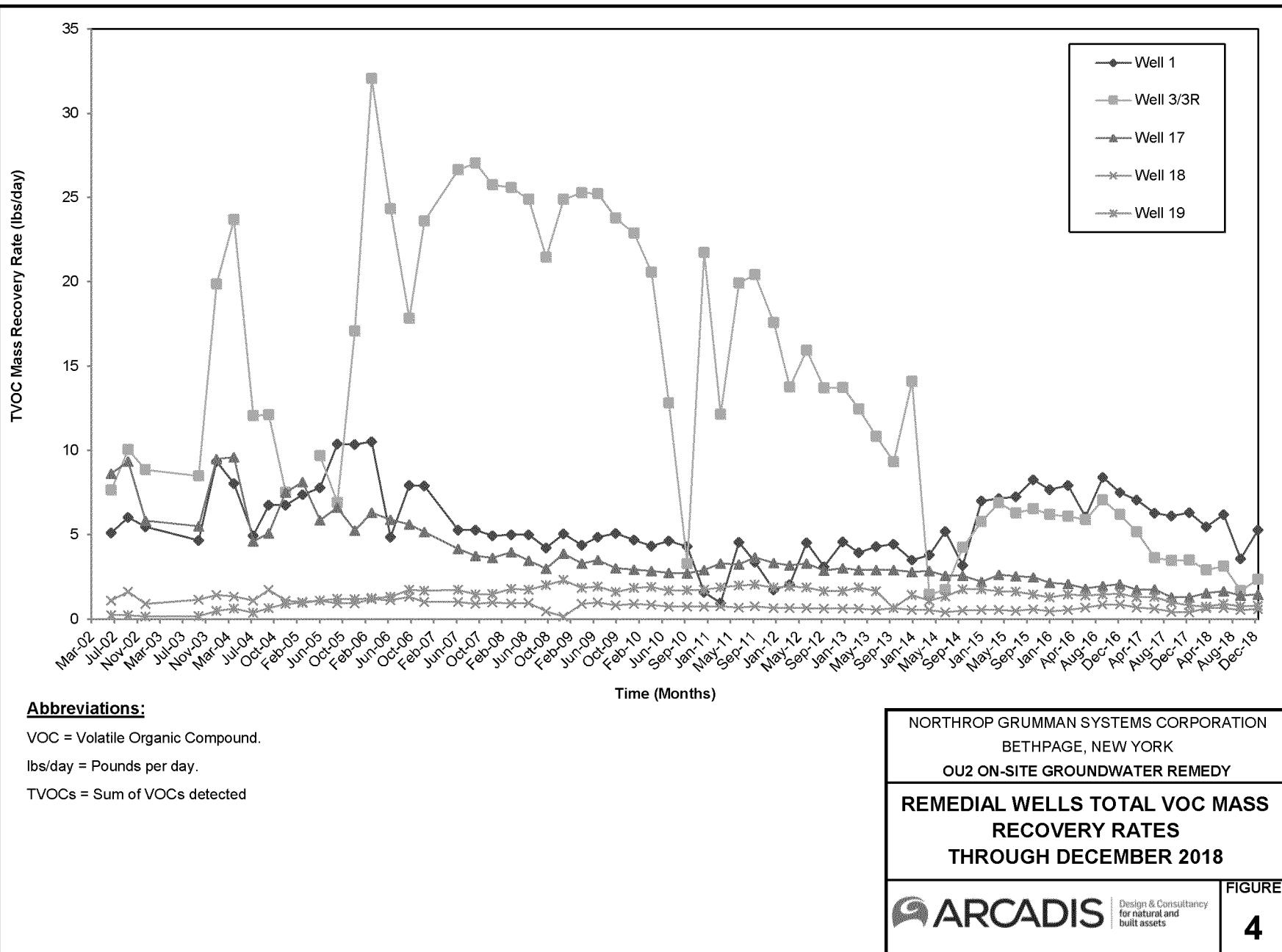


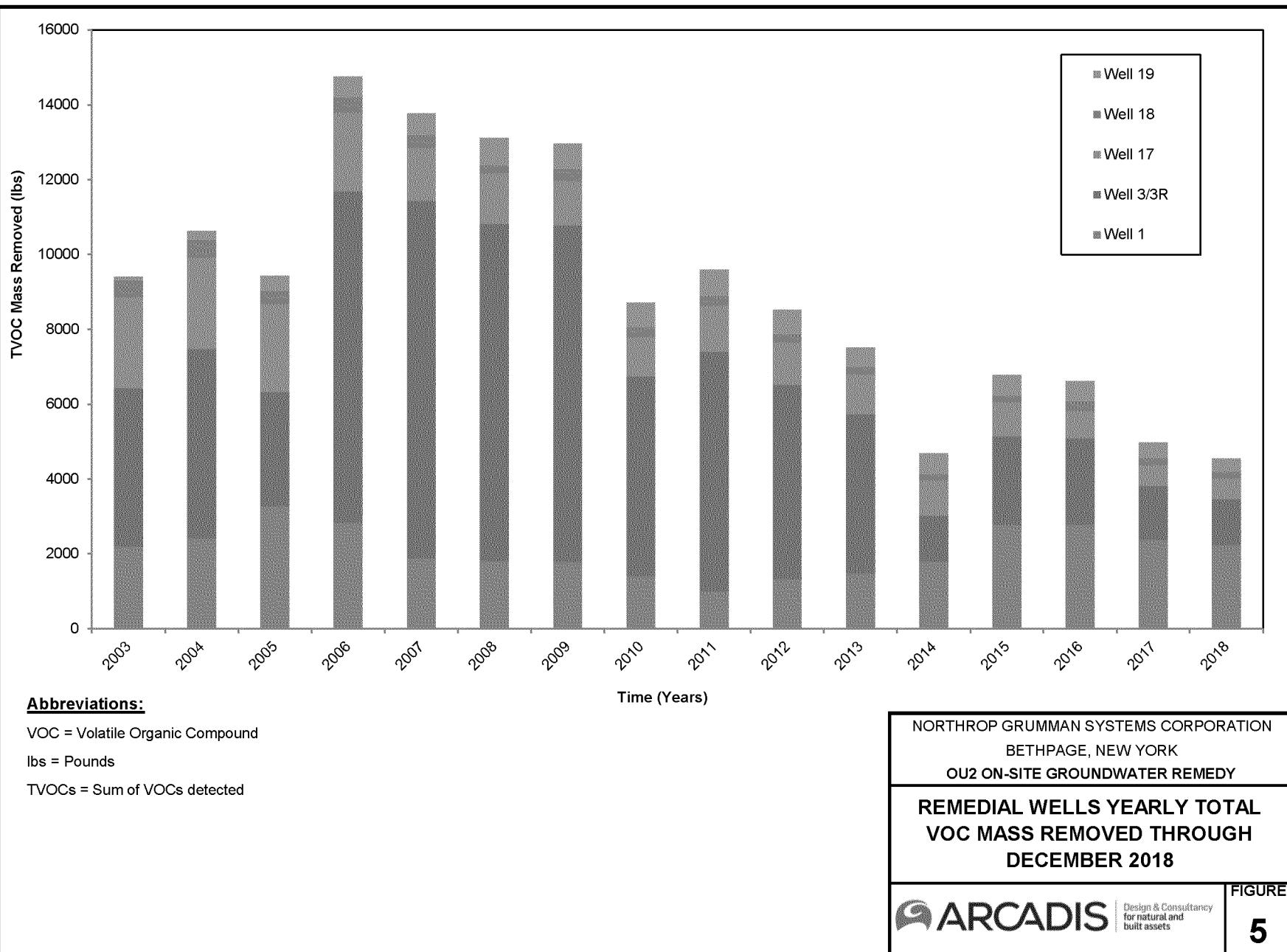
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2
**ONCT GROUNDWATER
EXTRACTION AND TREATMENT
SYSTEM SCHEMATIC**

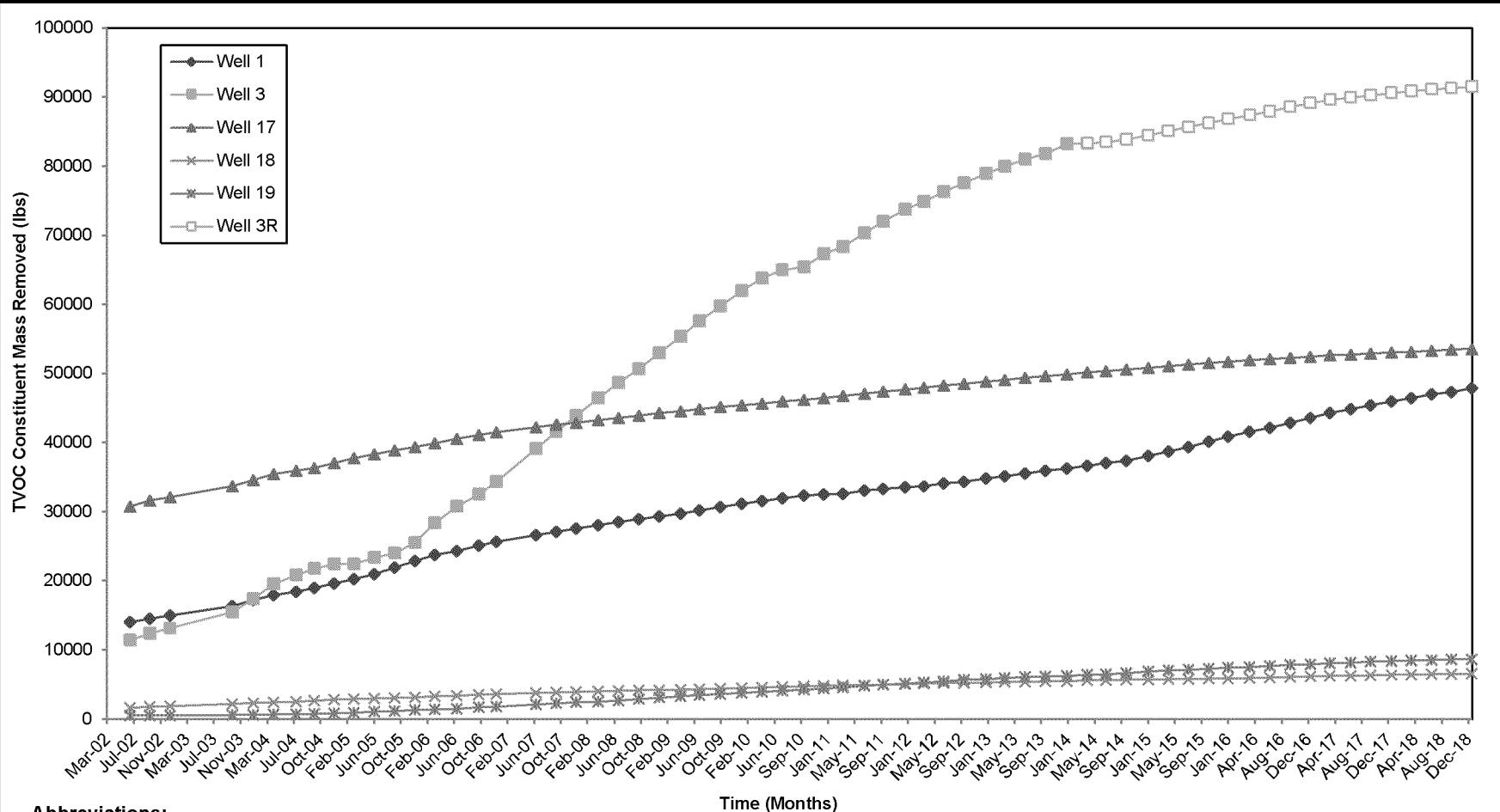
ARCADIS

Design & Consultancy
for natural and
built assets

FIGURE
3







Abbreviations:

VOC = Volatile Organic Compound

lbs = Pounds

TVOCs = Sum of VOCs detected

ONCT = On-Site Containment

Notes:

1. Cumulative Total VOC Mass Removed includes mass removed since startup of the ONCT system in September 1998.

2. First, second and third quarters 2003, and first and second quarters 2007 were reported jointly.

NORTHROP GRUMMAN SYSTEMS CORPORATION

BETHPAGE, NEW YORK

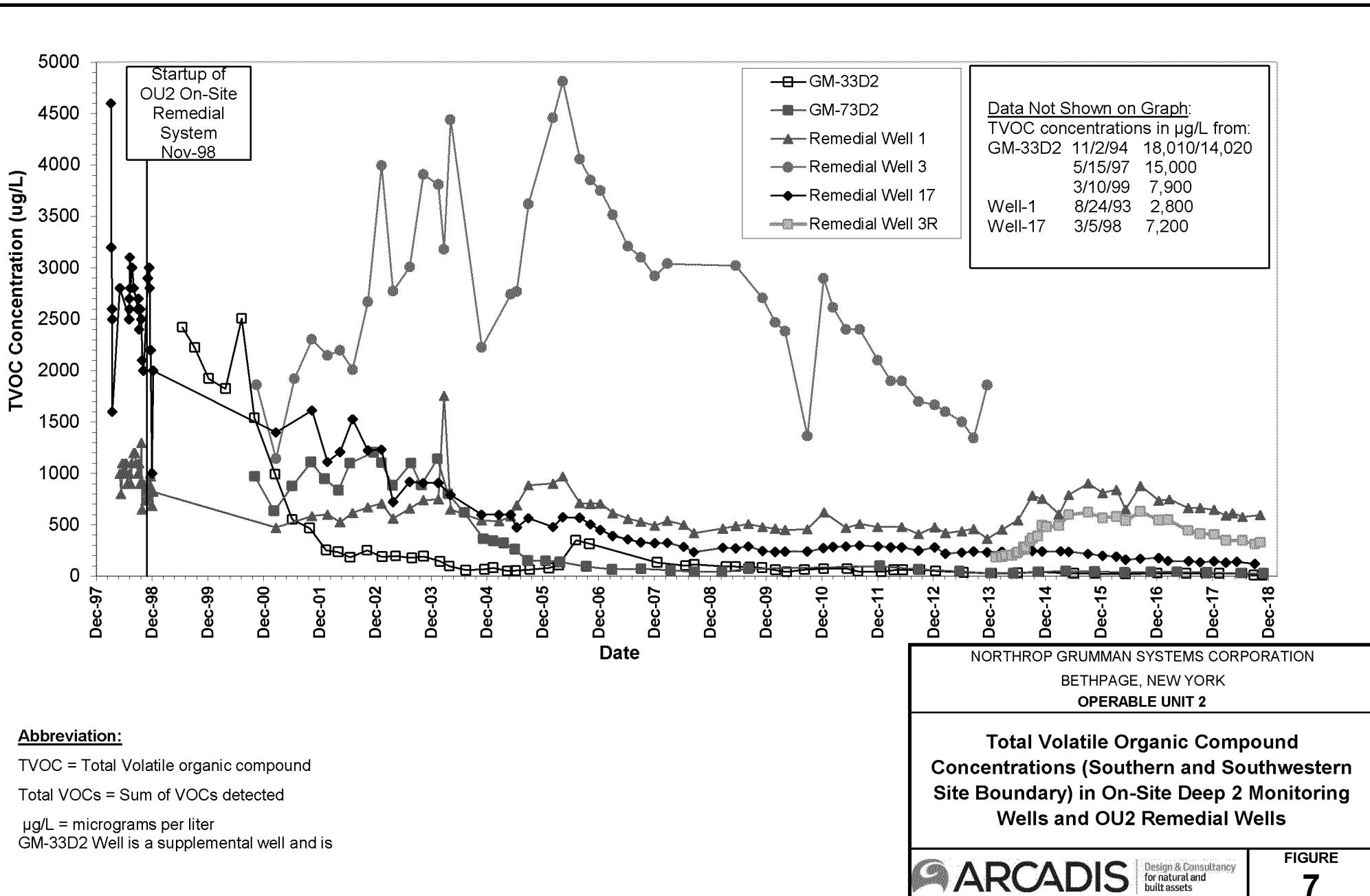
OU2 ON-SITE GROUNDWATER REMEDY

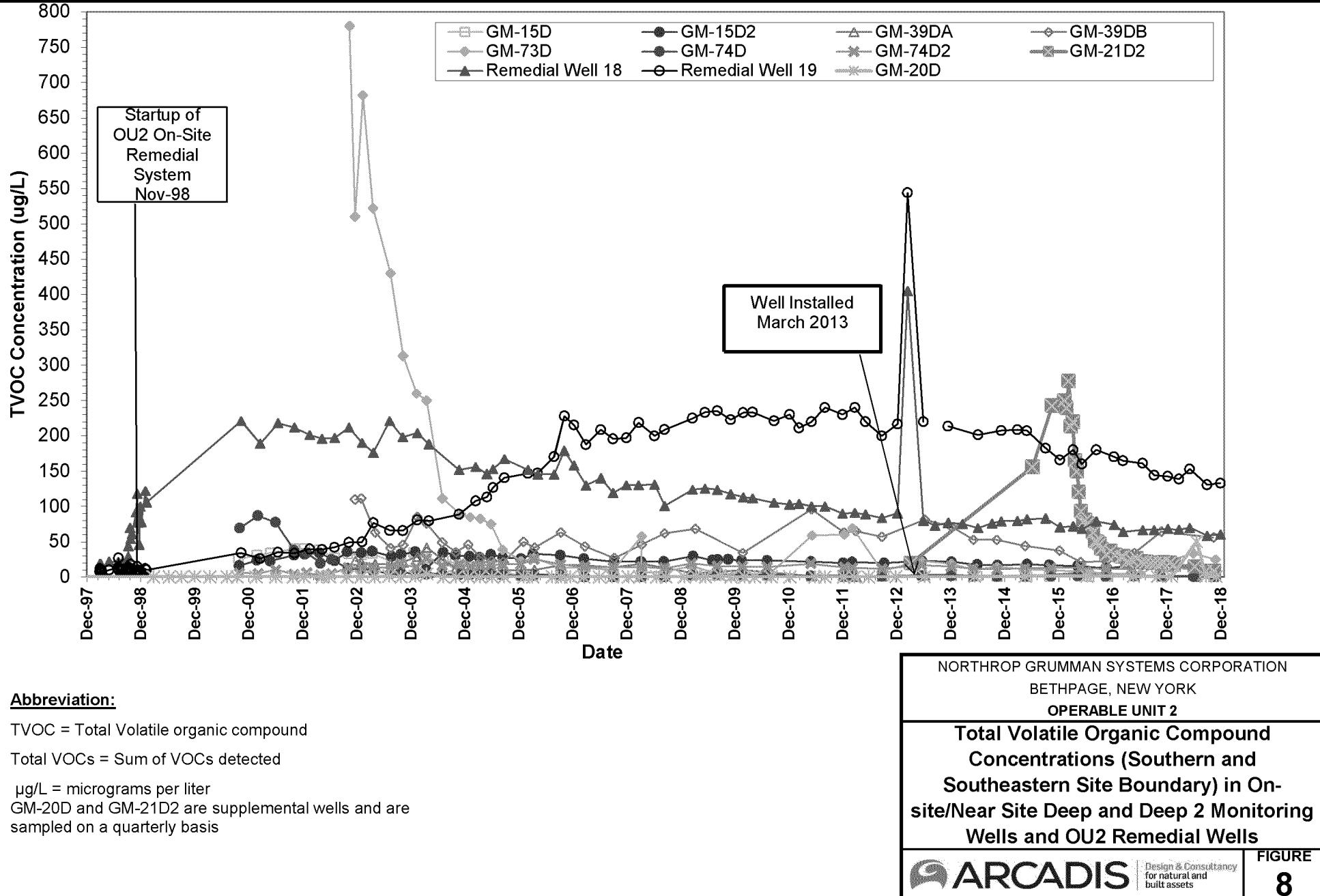
**REMEDIAL WELLS CUMULATIVE
TOTAL VOC MASS REMOVED
THROUGH DECEMBER 2018**



Design & Consultancy
for natural and
built assets

FIGURE
6







EXPLANATION:

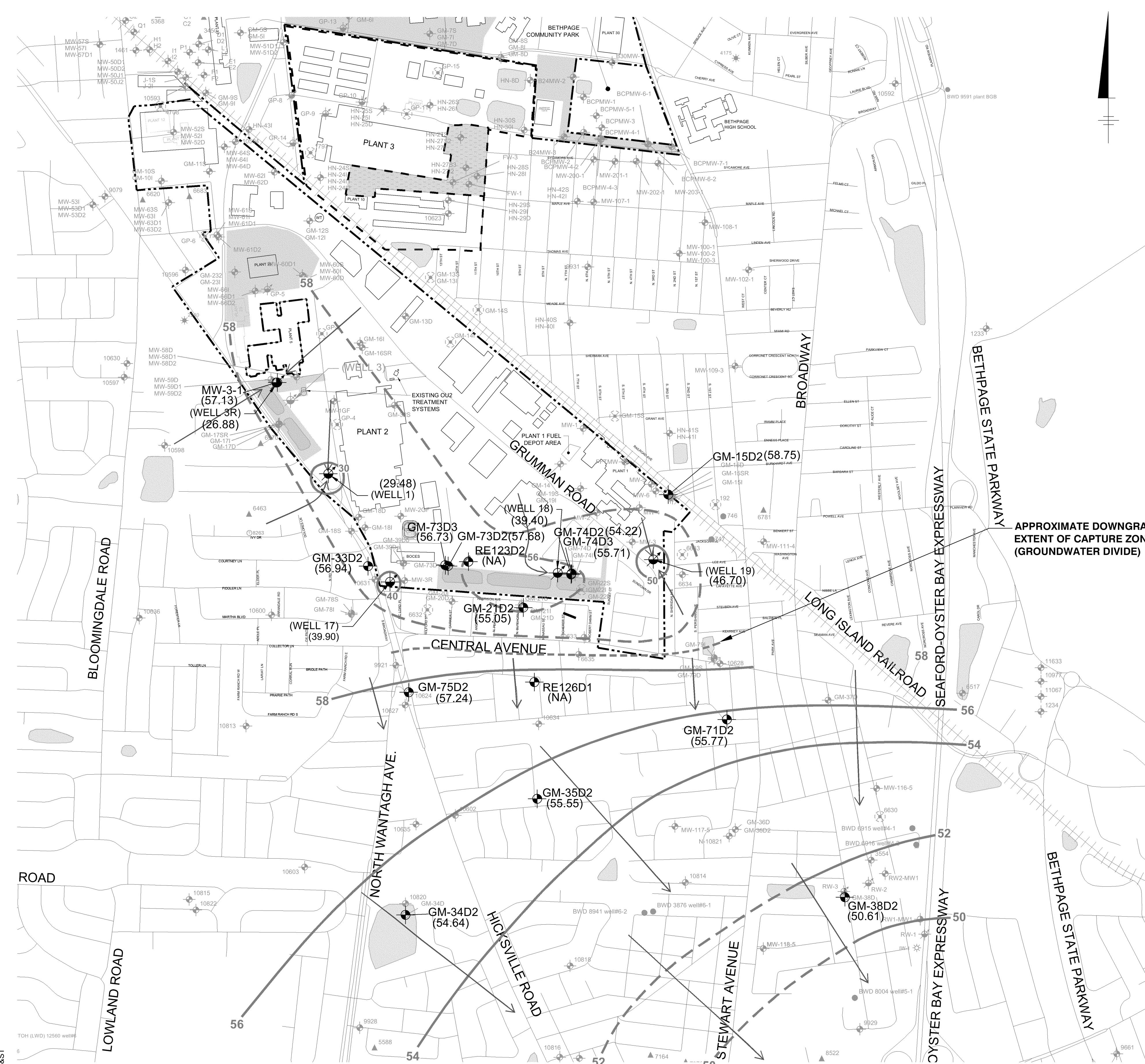
- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
 - PROPERTY BOUNDARY OF THE FORMER U.S. NAVY SITE
 - +— LONG ISLAND RAILROAD
 - NORTHPROP GRUMMAN PROPERTY AS OF 2009
 - NAVY PROPERTY AS OF 2014
 - RECHARGE BASIN
 - ◆— OBSERVATION/MONITORING WELL
 - ▲— INDUSTRIAL WELL
 - PUBLIC SUPPLY WELL
 - ★— IRRIGATION WELL
 - ◆— NORTHPROP GRUMMAN ONCT WELL
 - ABANDONED WELL
 - Line of equal water-level elevation in feet relative to mean sea level (dashed where less control)
 - Water-level elevation in feet relative to mean sea level
 - Direction of horizontal component of groundwater flow
 - OU-2 OPERABLE UNIT 2
 - OU-3 OPERABLE UNIT 3
- * DUE TO ANOMALOUS VALUE RECORDED IN FOURTH QUARTER 2018, SECOND QUARTER DATA IS FACTORED IN RELATIVE TO THE NEARBY WELLS

NOTES:

1. NORTHPROP GRUMMAN ONCT WELLS 1, 3R, 17, 18 AND 19 SCREENED IN DEEP 2 ZONE.
2. BETHPAGE WATER DISTRICT WELL 3876 SCREENED IN DEEP ZONE.
3. BETHPAGE WATER DISTRICT WELLS 6915 AND 6916 SCREENED IN DEEP 2 ZONE.
4. BETHPAGE WATER DISTRICT WELL 8941 SCREENED IN DEEP 3 ZONE.

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

**WATER-TABLE ELEVATION AND GENERALIZED
HORIZONTAL GROUNDWATER FLOW DIRECTIONS IN
THE SHALLOW/INTERMEDIATE ZONE,
OCTOBER 2018**



EXPLANATION:

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF THE FORMER NAVY SITE
- LONG ISLAND RAILROAD
- NORTHROP GRUMMAN PROPERTY AS OF 2009
- NAVY PROPERTY AS OF 2014
- RECHARGE BASIN
- OBSERVATION/MONITORING WELL
- INDUSTRIAL WELL
- PUBLIC SUPPLY WELL
- IRRIGATION WELL
- NORTHROP GRUMMAN ONCT WELL
- ABANDONED WELL
- LINE OF EQUAL WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE LESS CONTROL)
- WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
- DIRECTION OF HORIZONTAL COMPONENT OF GROUNDWATER FLOW
- OU-2 OPERABLE UNIT 2
- OU-3 OPERABLE UNIT 3
- NA NOT APPLICABLE, WATER LEVEL MEASUREMENTS COLLECTED IN DECEMBER 2018 OUTSIDE OF OCTOBER 2018 SYNOPTIC PERIOD

NOTES:

1. NORTHROP GRUMMAN ONCT WELLS 1, 3R, 17, 18 AND 19 SCREENED IN DEEP 2 ZONE.
2. BETHPAGE WATER DISTRICT WELL 3876 SCREENED IN DEEP ZONE (NOT PUMPING IN OCTOBER 2018).
3. BETHPAGE WATER DISTRICT WELLS 6915 AND 6916 SCREENED IN DEEP 2 ZONE.
4. BETHPAGE WATER DISTRICT WELL 8941 SCREENED IN DEEP 3 ZONE (NOT PUMPING IN OCTOBER 2018).

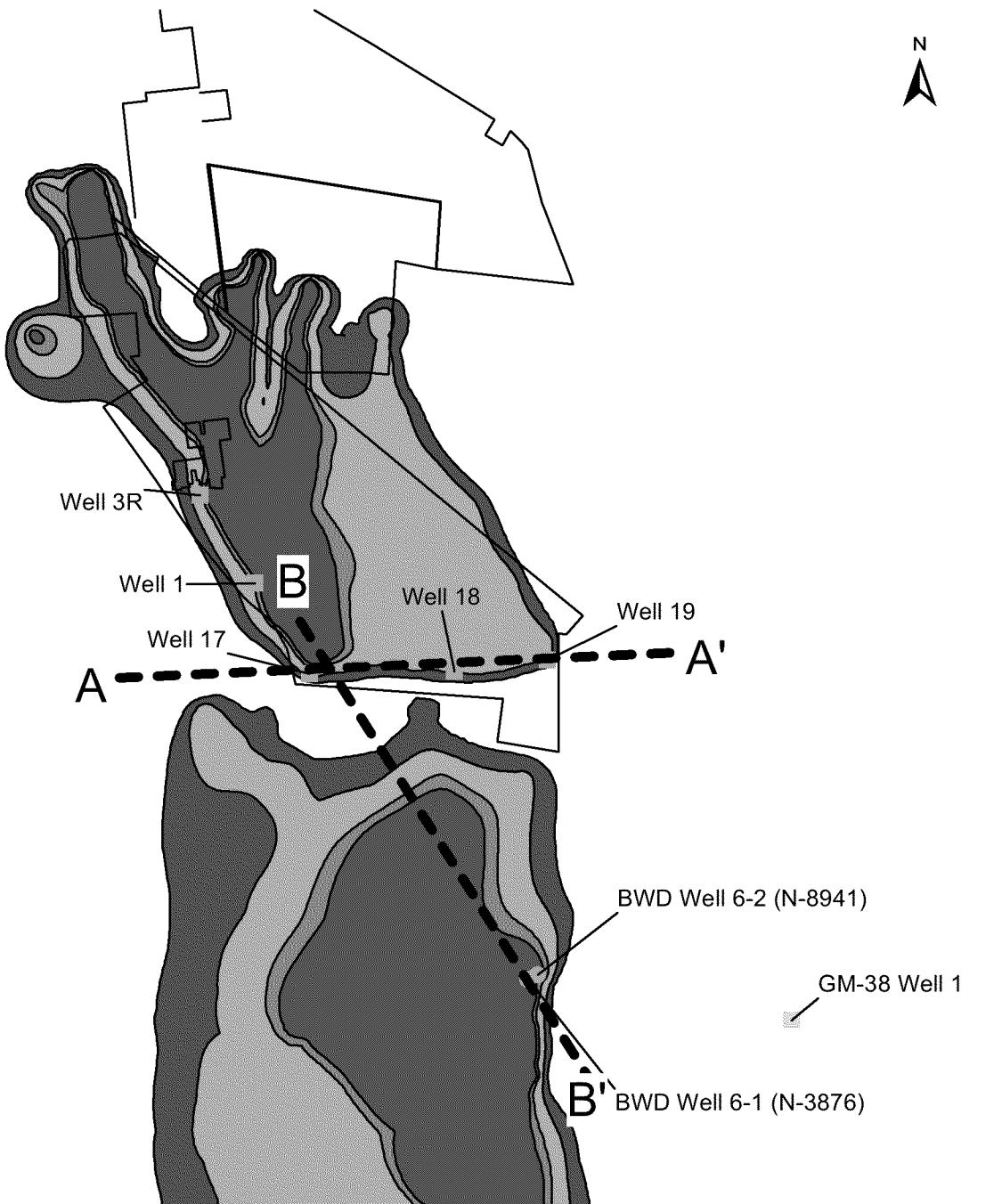
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

POTENIOMETRIC SURFACE ELEVATION AND
GENERALIZED HORIZONTAL GROUNDWATER FLOW
DIRECTIONS IN THE DEEP 2 ZONE
OCTOBER 2018



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FIGURE
10



Total Volatile Organic Compound (TVOC)
Concentrations ($\mu\text{g}/\text{L}$)

1,000
500
50
5

— Boundary of the Former
Northrop Grumman / NWIRP Site

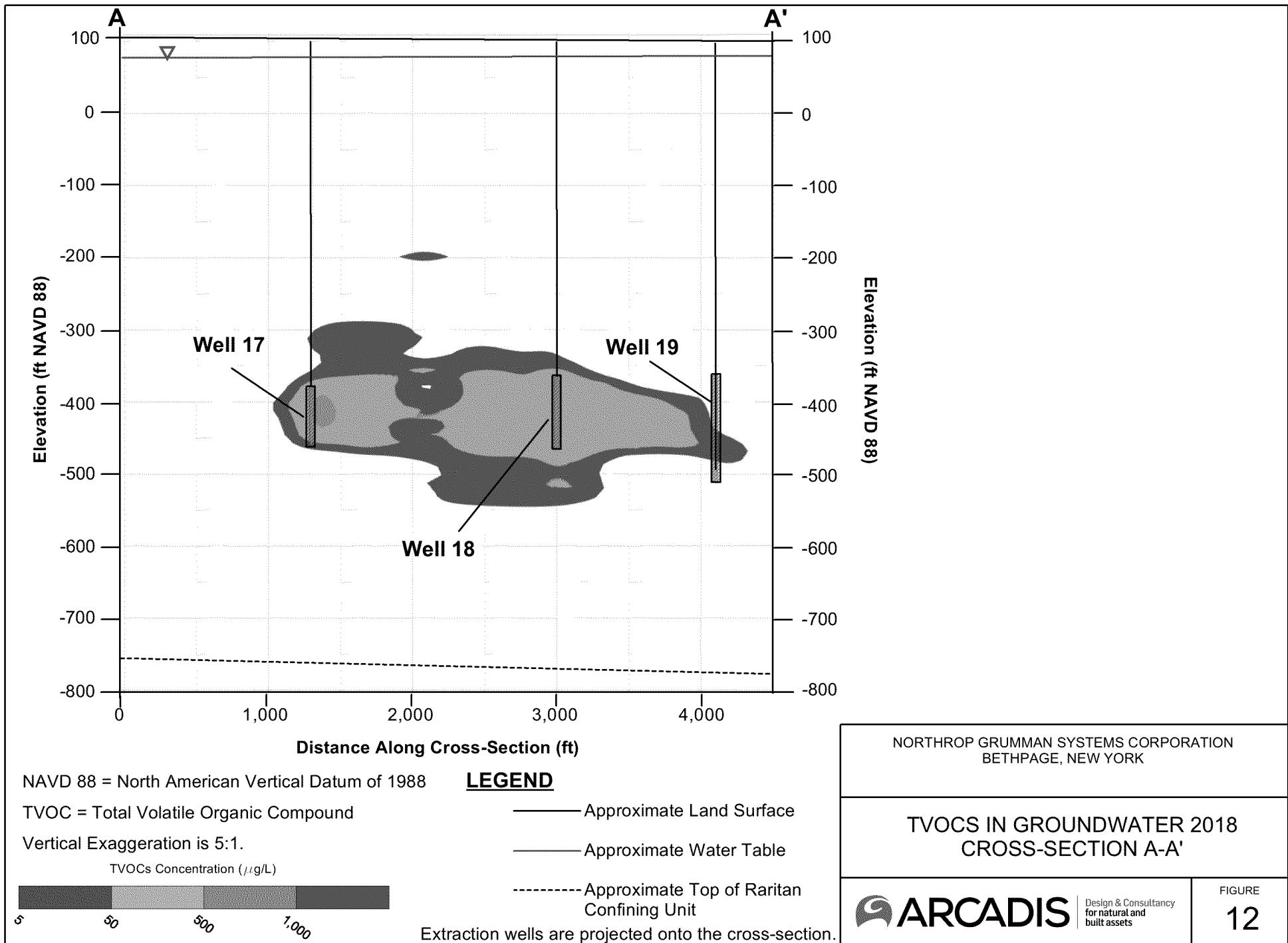
A-A'--- Cross-Section Line

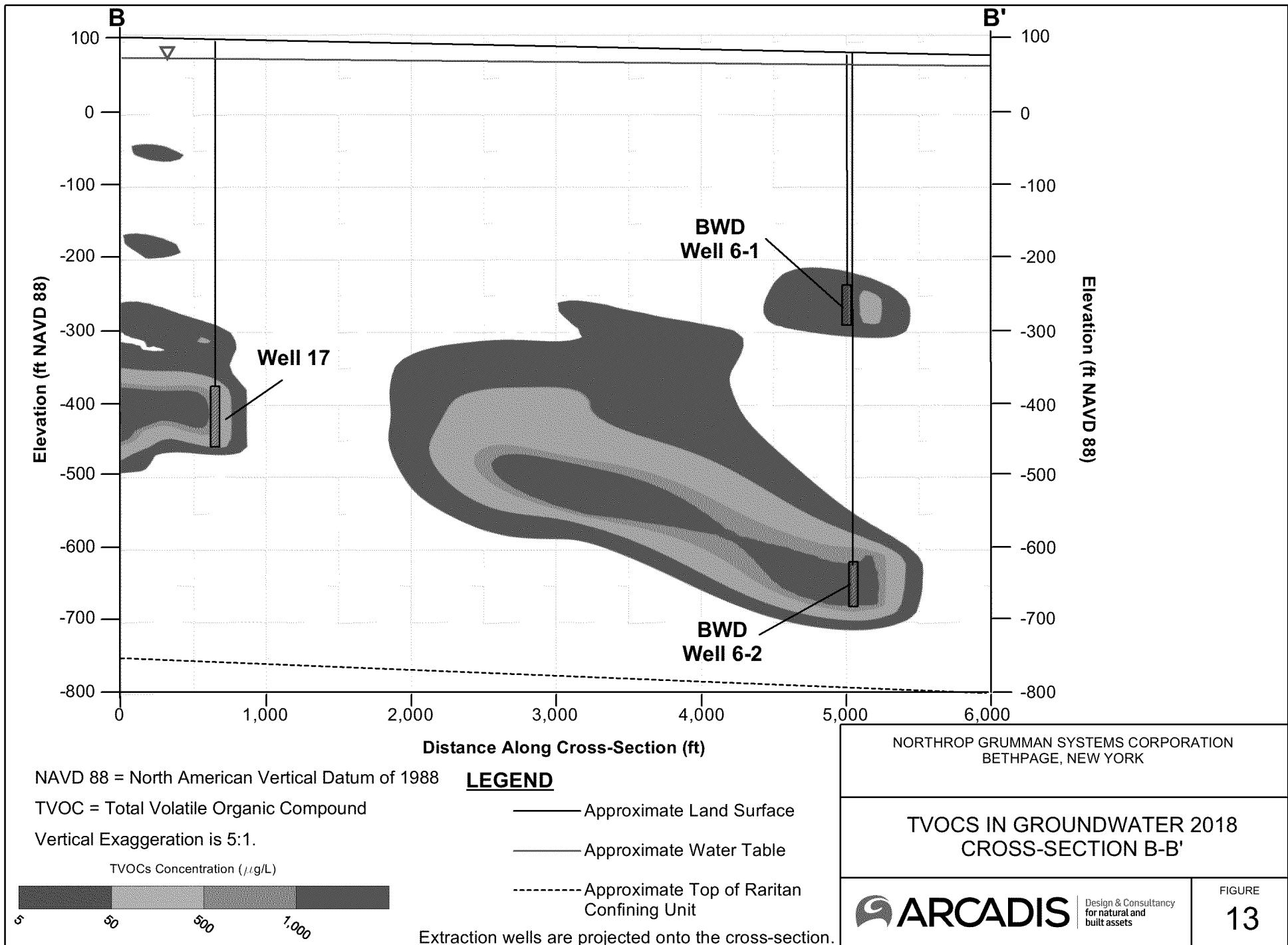
Plume is based on the most recently available data from each sampling location collected between 2007 and 2018. Data were collected from monitoring wells, vertical profile borings, and extraction wells.

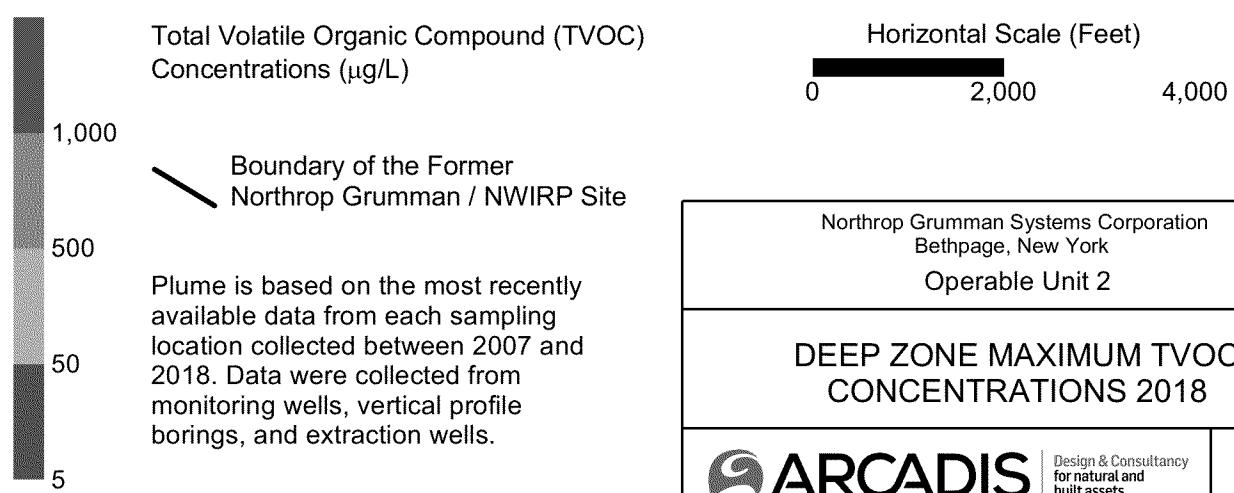
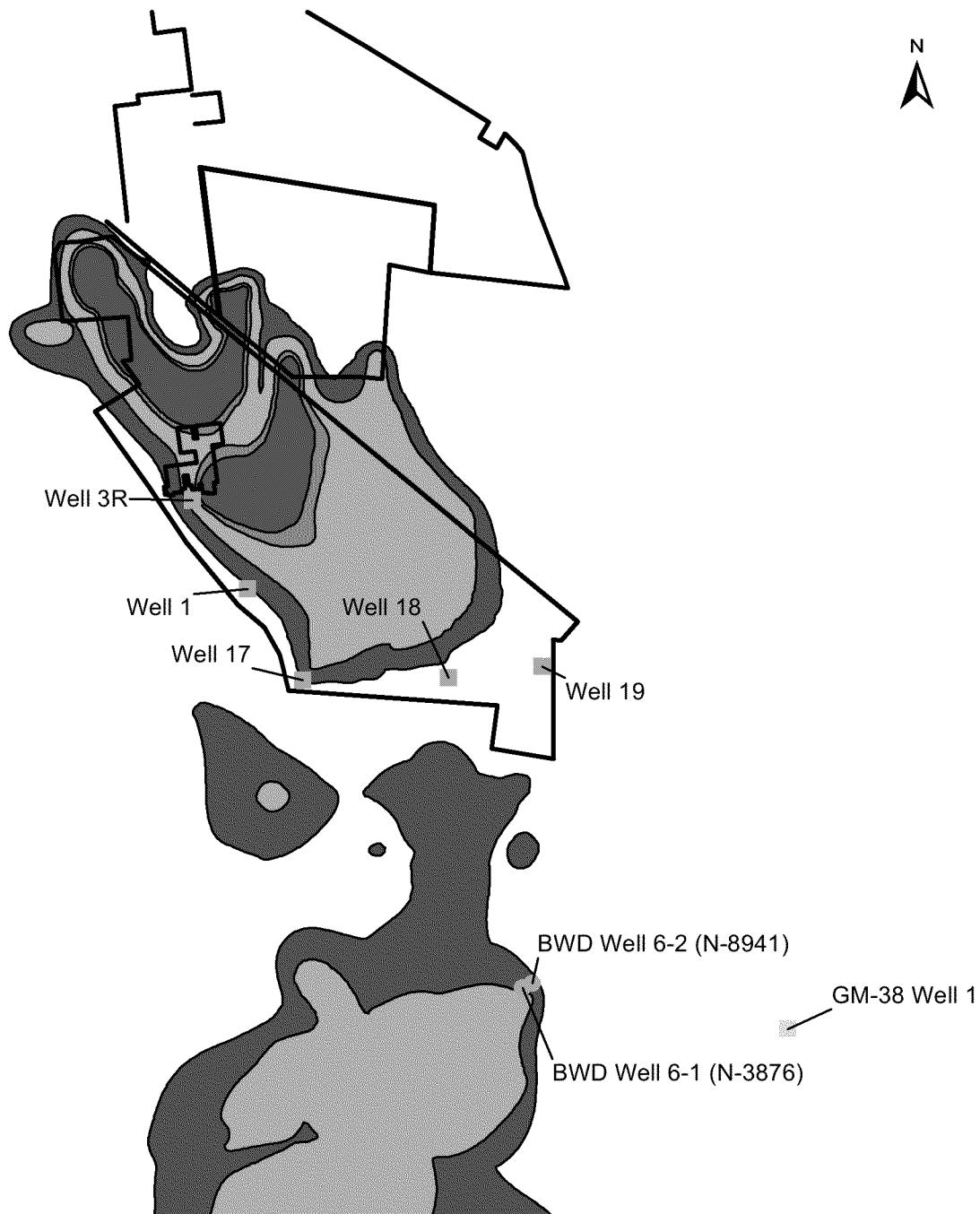
Horizontal Scale (Feet)

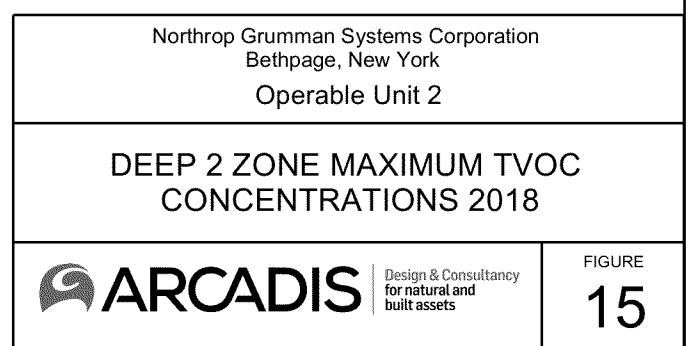
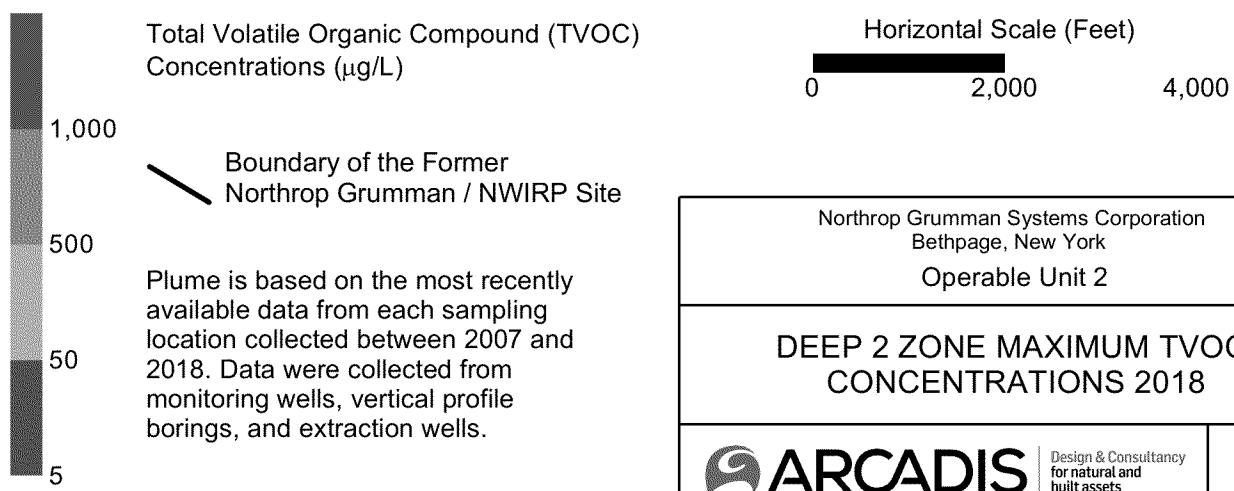
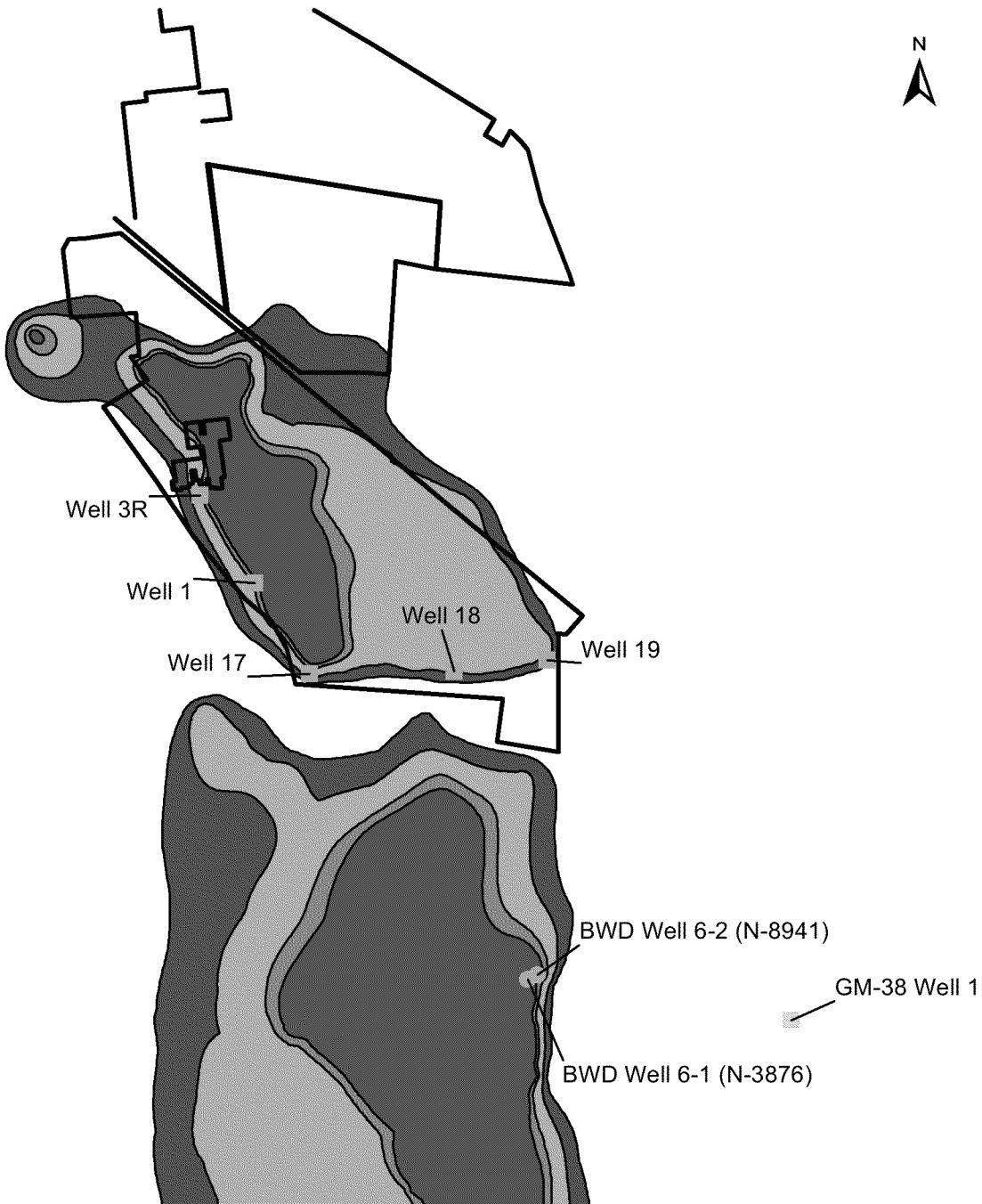
0 2,000 4,000

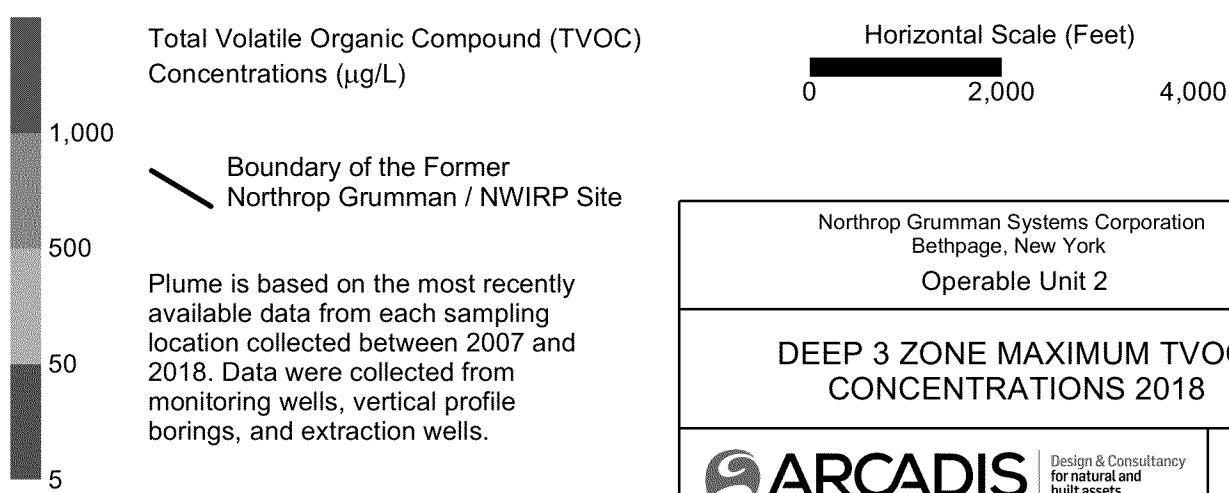
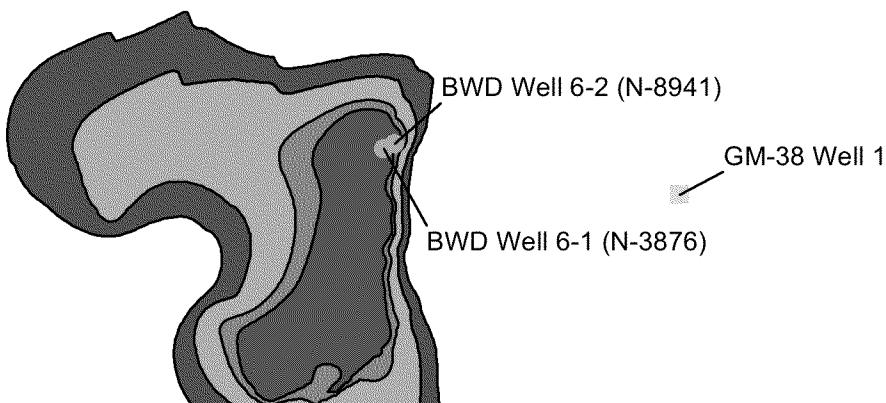
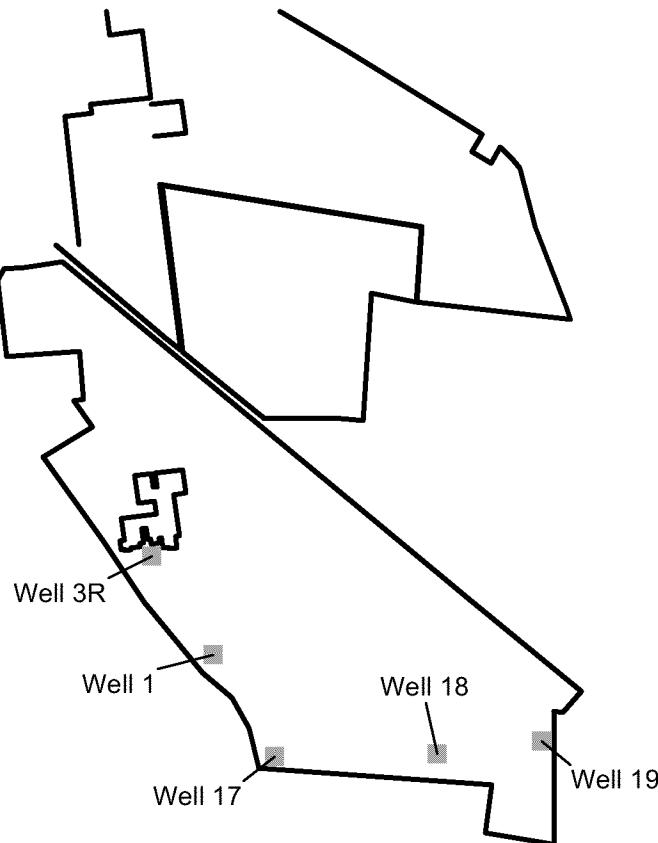
Northrop Grumman Systems Corporation Bethpage, New York Operable Unit 2	
CROSS-SECTION LINES AND MAXIMUM TVOC CONCENTRATIONS 2018	
ARCADIS Design & Consultancy for natural and built assets	FIGURE 11

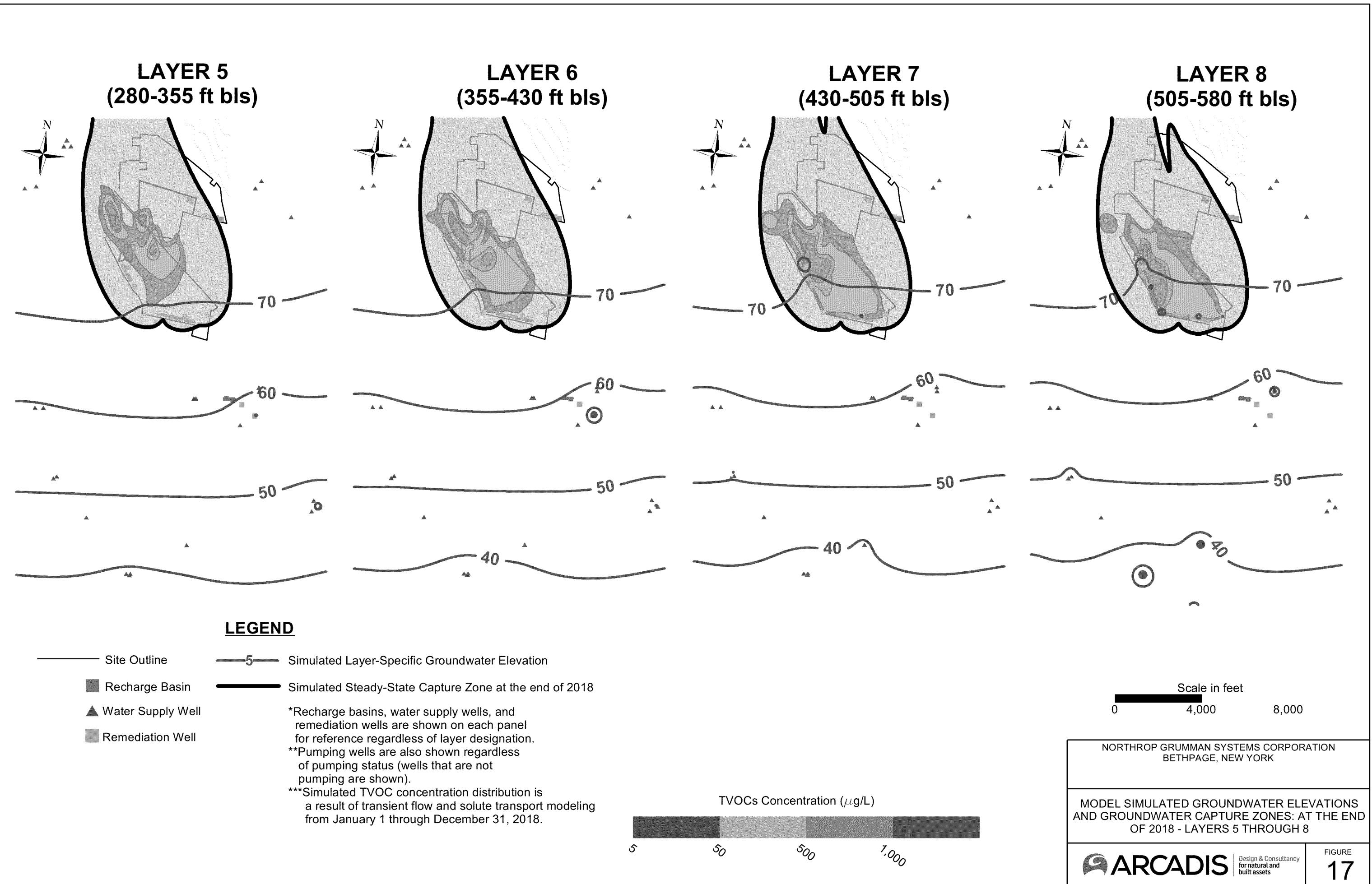


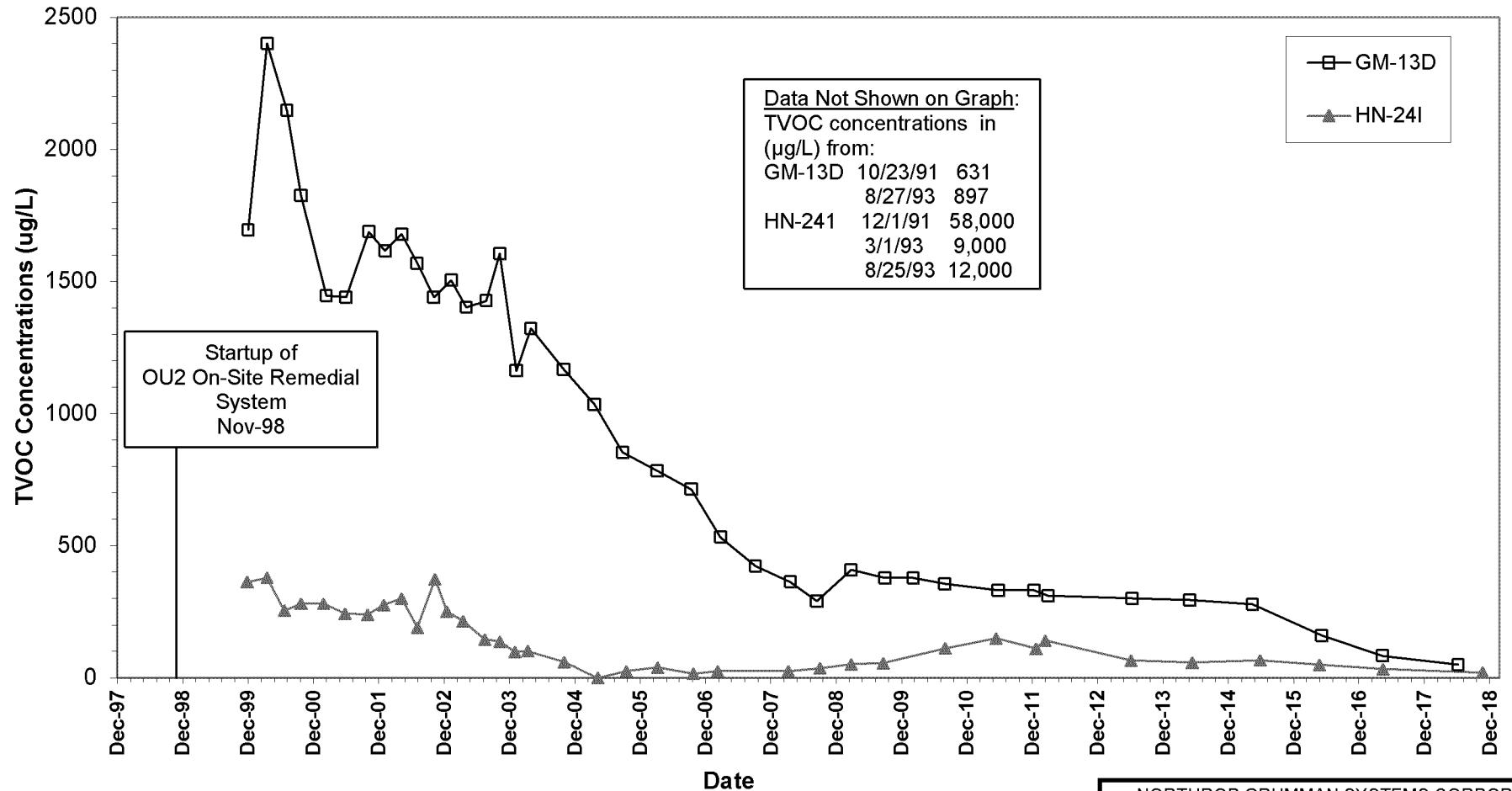










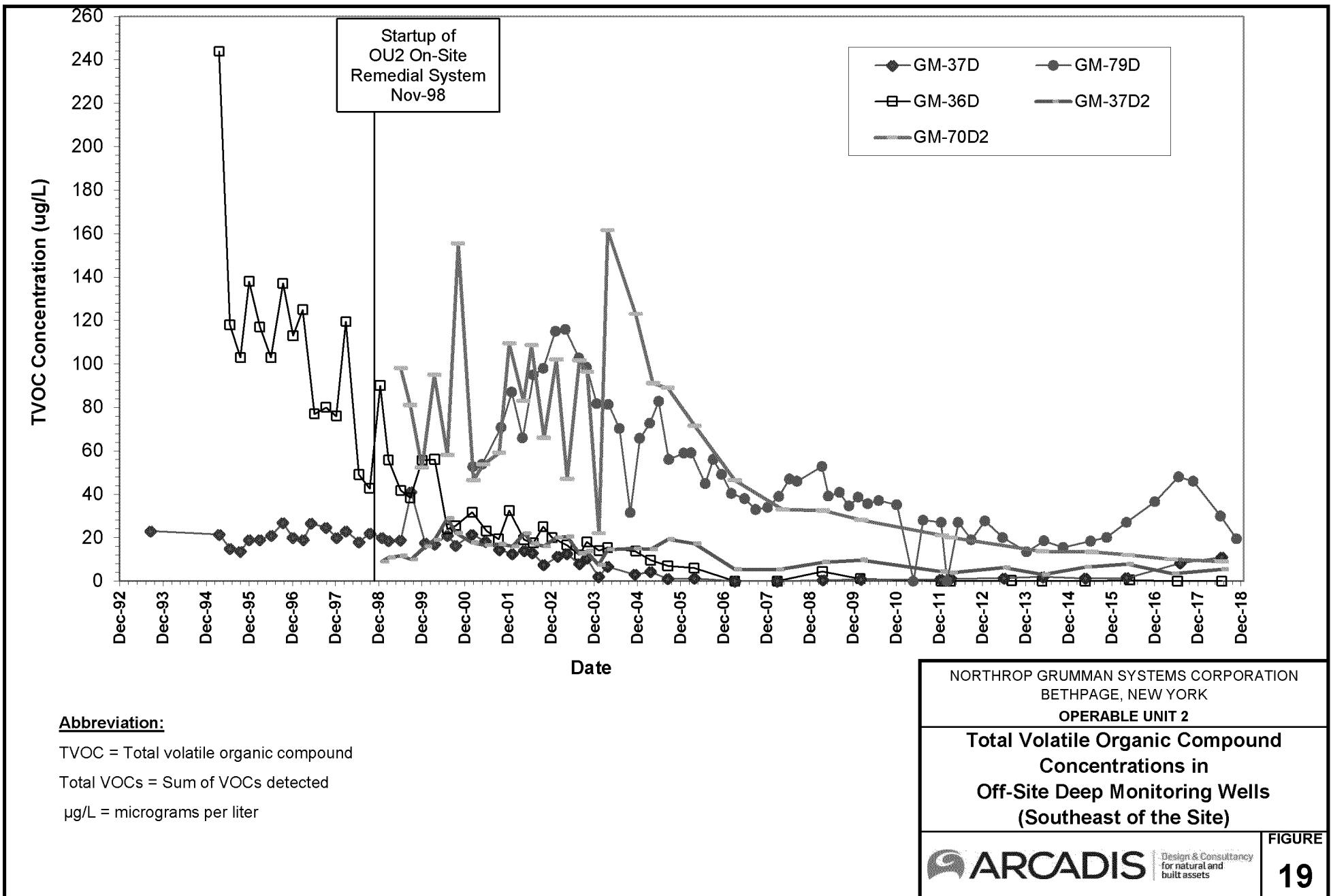


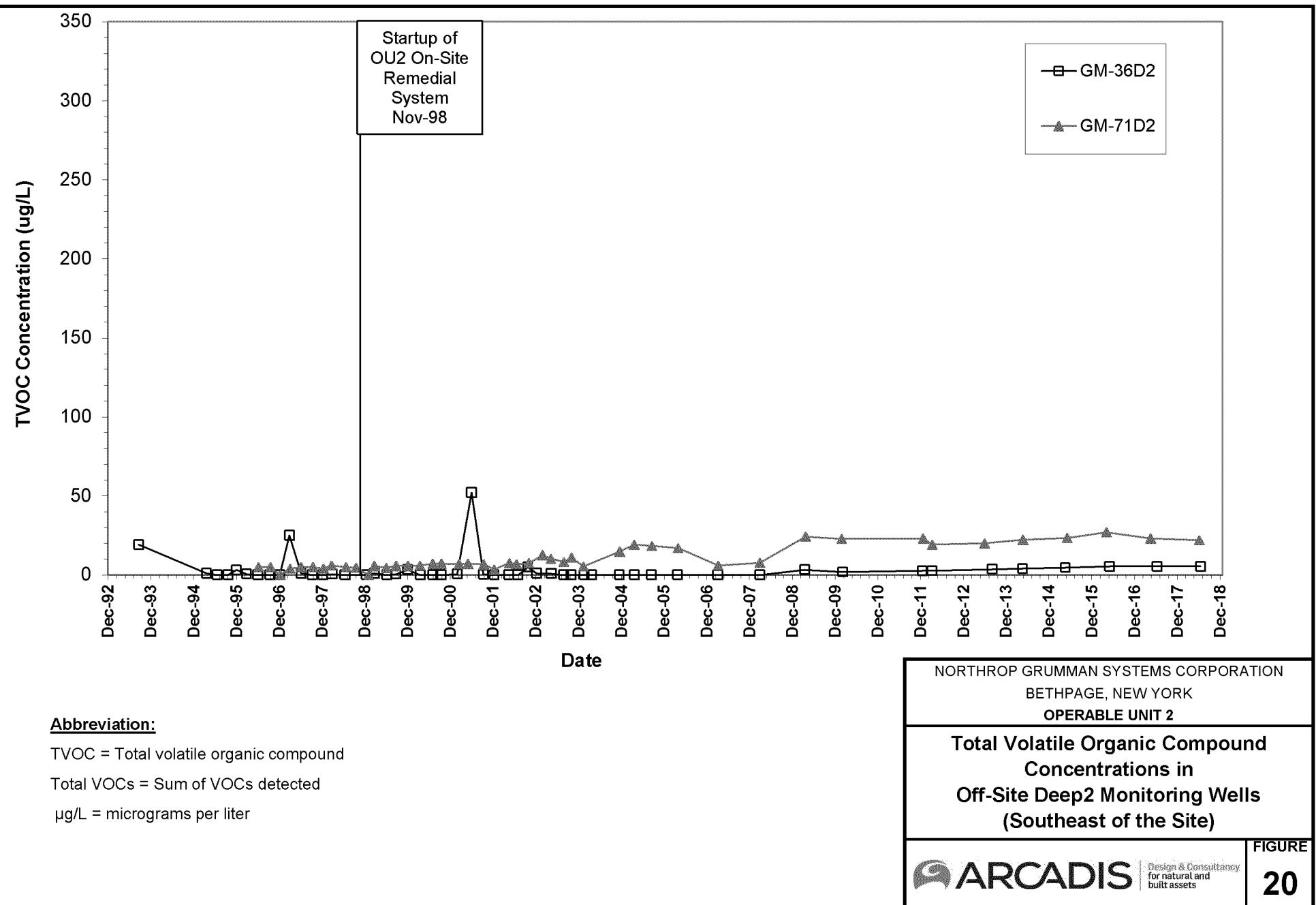
NORTHROP GRUMMAN SYSTEMS CORPORATION
 BETHPAGE, NEW YORK
OPERABLE UNIT 2

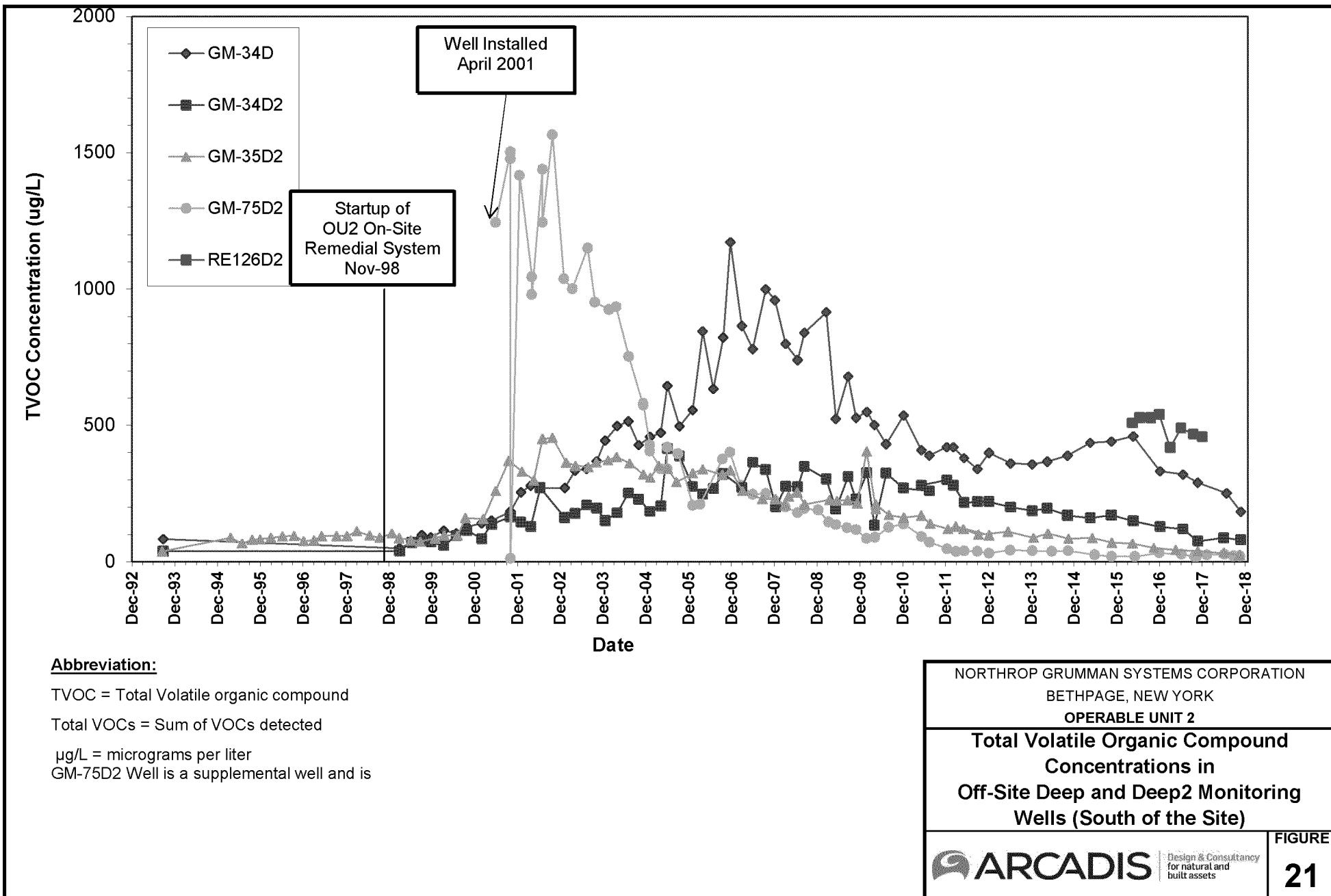
**Total Volatile Organic Compound
 Concentrations in On-Site Intermediate
 Monitoring Wells**

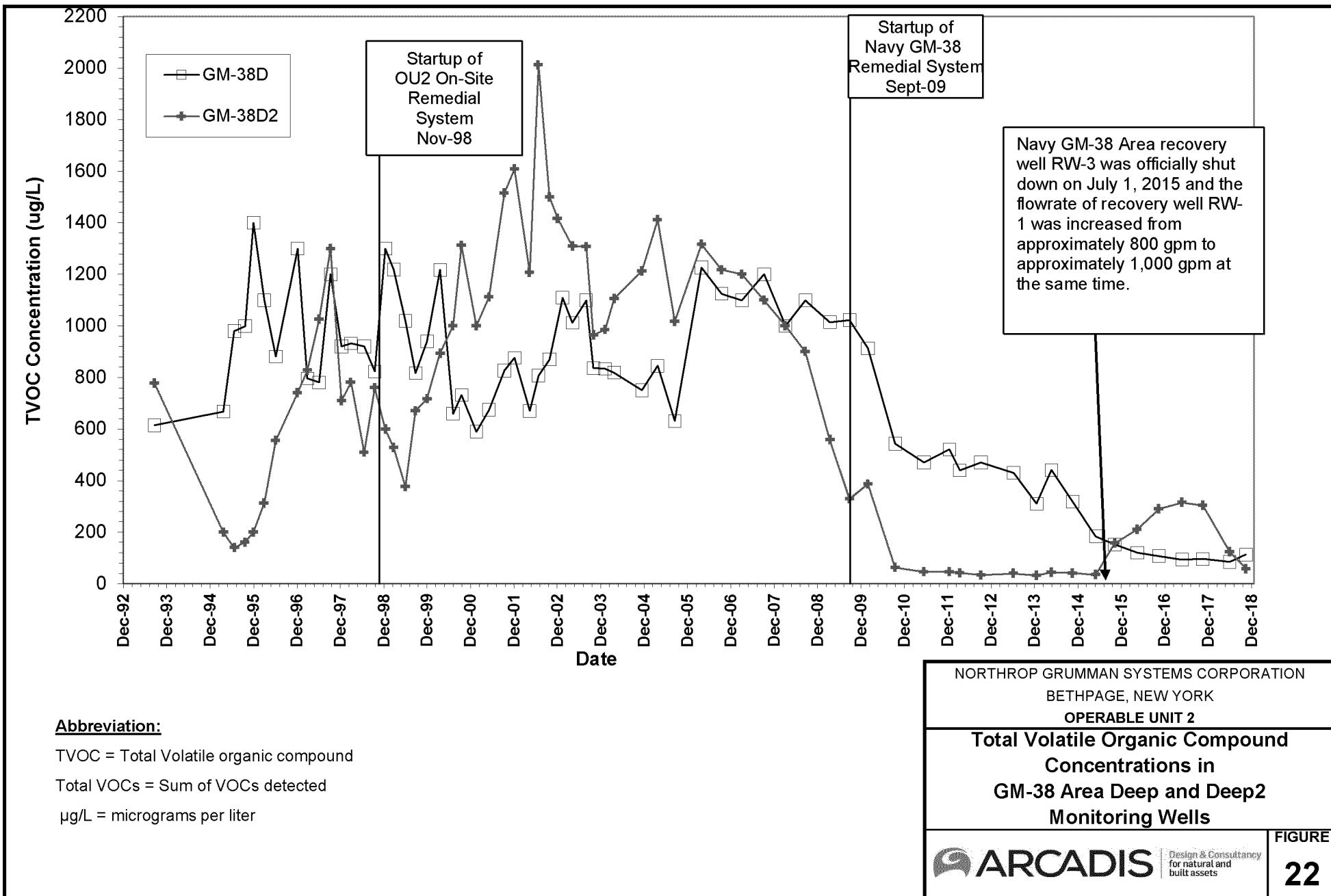


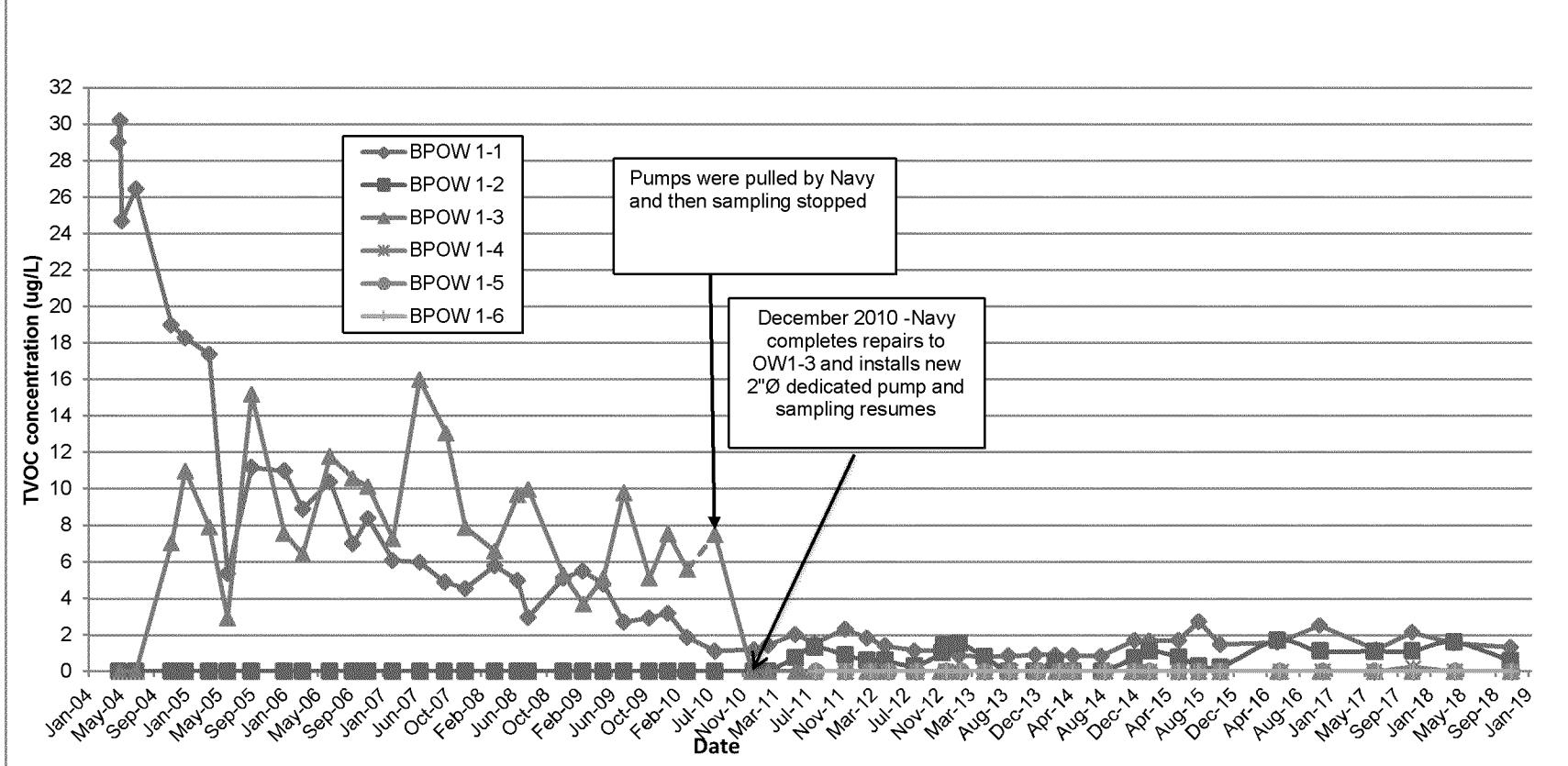
**FIGURE
 18**











Notes and Abbreviations:

TVOCs: Total Volatile Organic Compounds

SFWD: South Farmingdale Water District

ug/L = micrograms per Liter

Total VOCs= Sum of VOCs Detected

NORTHROP GRUMMAN SYSTEMS CORPORATION

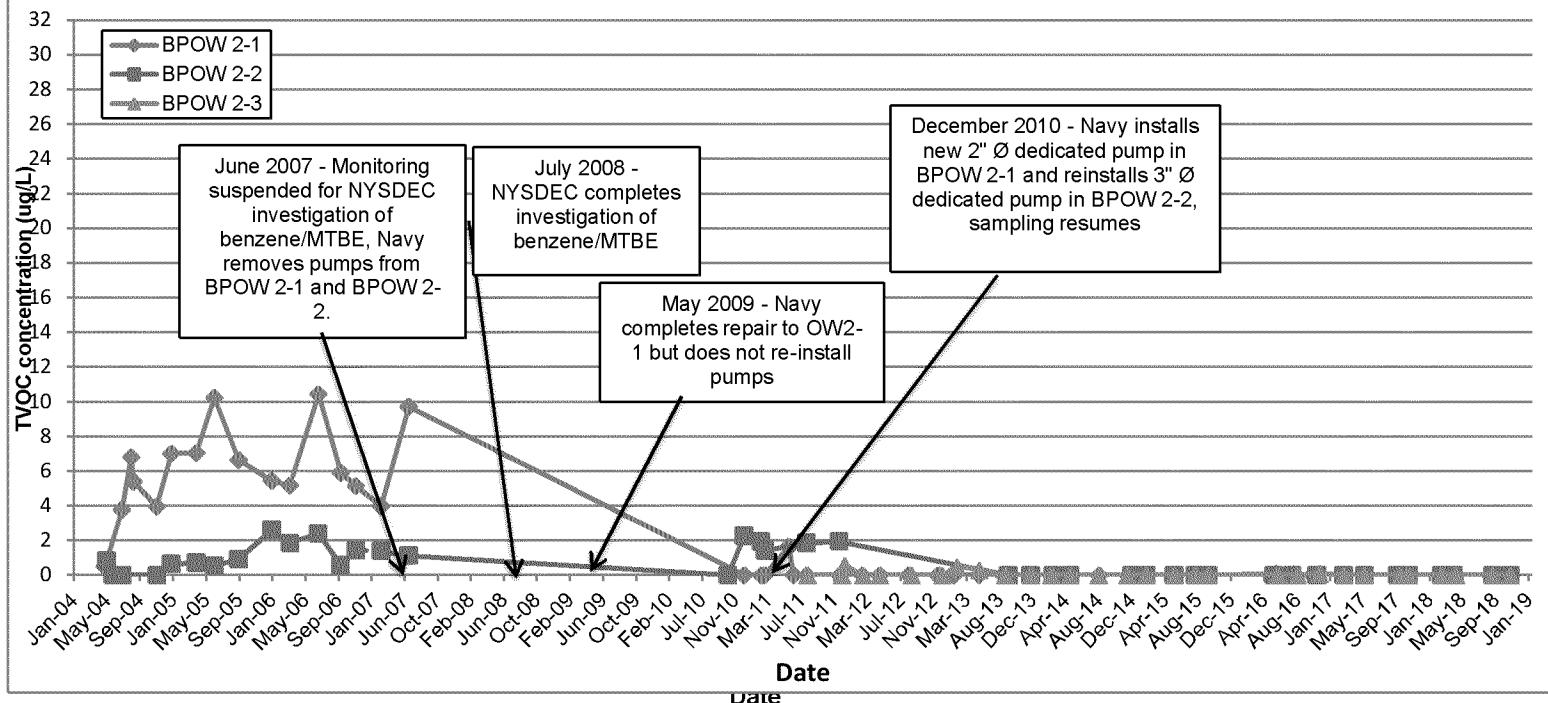
BETHPAGE, NEW YORK

OPERABLE UNIT 2

**Total Volatile Organic Compound
Concentrations in Outpost Wells BPOW1-
1, BPOW1-2, BPOW1-3, BPOW1-4, BPOW1-
5 and BPOW1-6
(Wells monitor SFWD Well Field 1)**

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23



Notes and Abbreviations:

TVOCs: Total Volatile Organic Compounds

SFWD: South Farmingdale Water District

ug/L = micrograms per Liter

Total VOCs= Sum of VOCs Detected

NORTHROP GRUMMAN SYSTEMS CORPORATION

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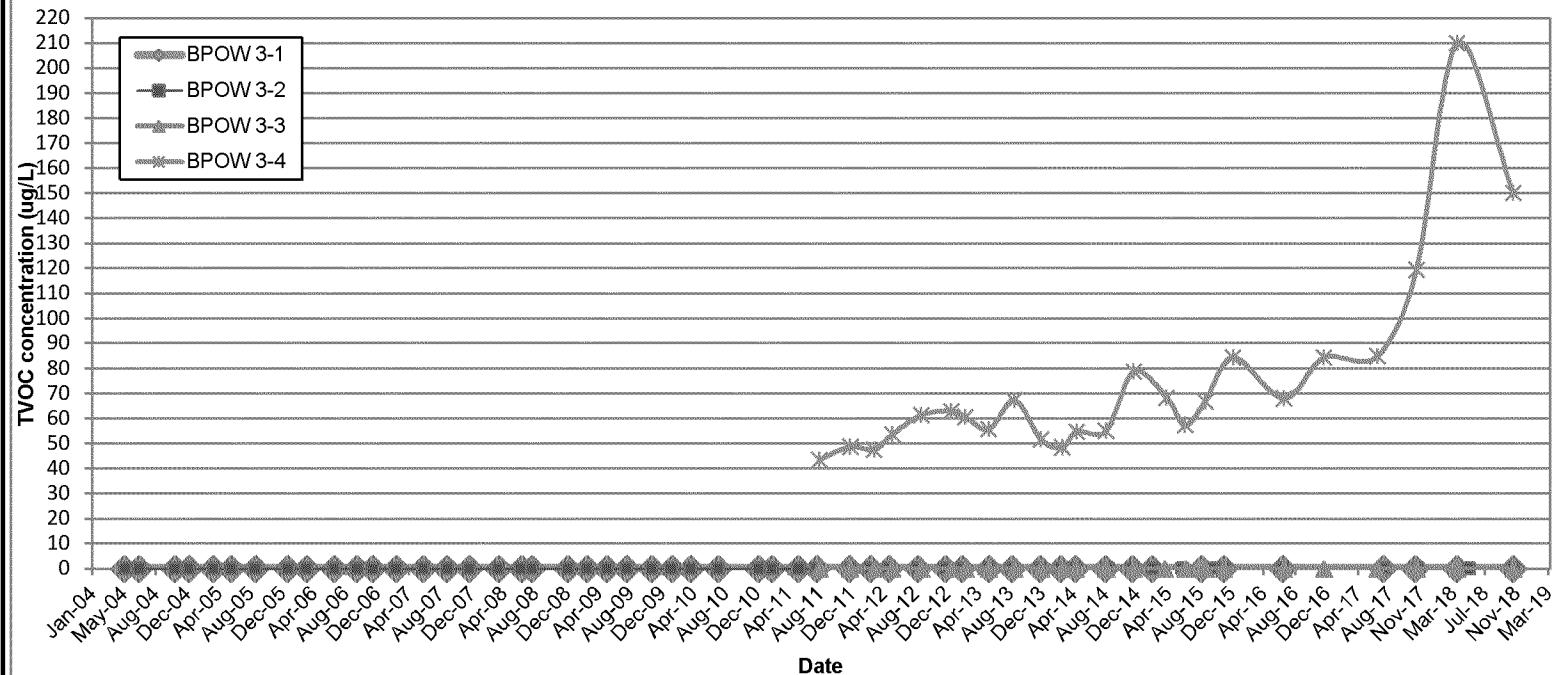
OPERABLE UNIT 2

**Total Volatile Organic Compound
Concentrations in Outpost Wells BPOW2-1,
BPOW2-2 and BPOW2-3
(Wells Monitor SFWD Well Field 3)**



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Notes and Abbreviations:

TVOCs for both BPOW 3-1 and BPOW 3-2 are non-detect for the duration of the sample history

TVOCs: Total Volatile Organic Compounds

NYAW: New York American Water

ug/L = micrograms per Liter

Total VOCs= Sum of VOCs Detected

NORTHROP GRUMMAN SYSTEMS CORPORATION

BETHPAGE, NEW YORK

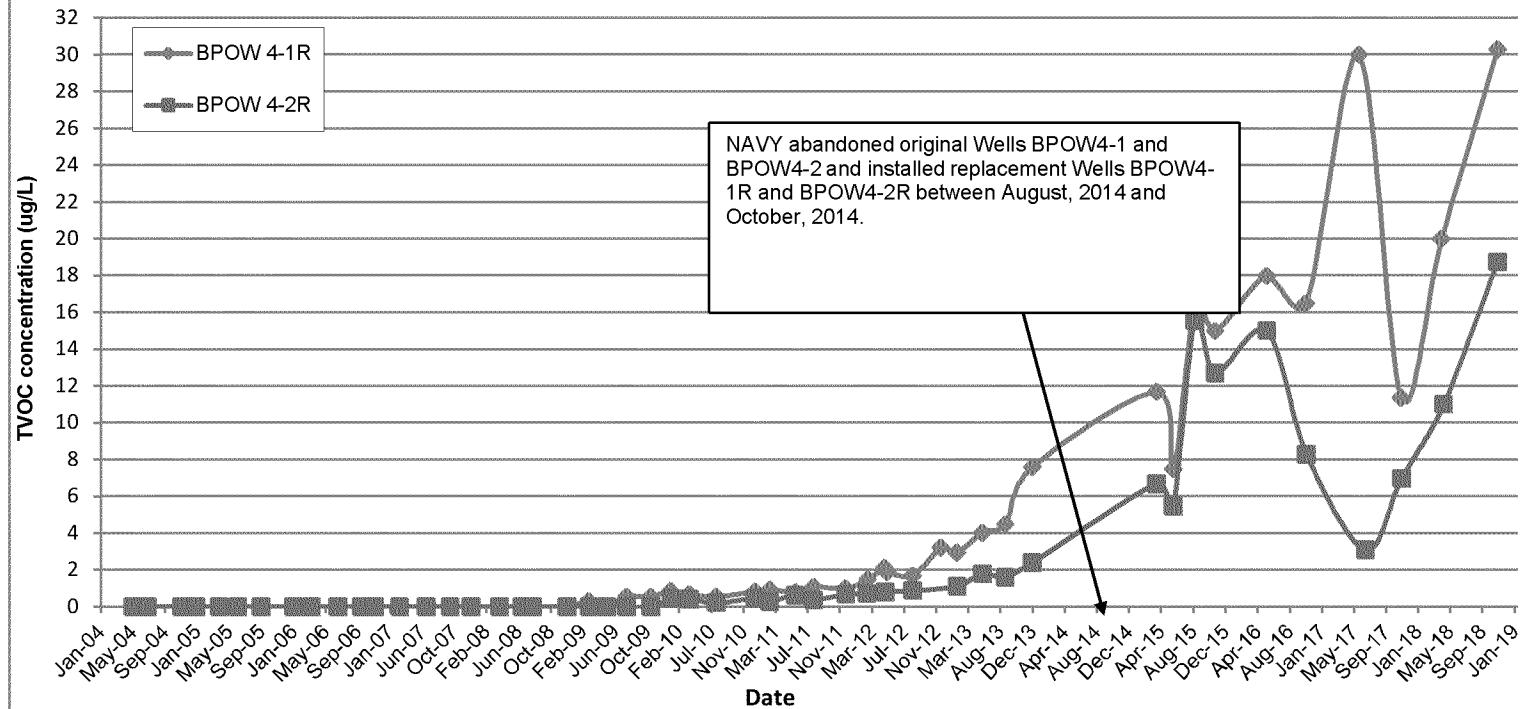
OPERABLE UNIT 2

**Total Volatile Organic Compound
Concentrations in Outpost Wells BPOW3-1,
BPOW3-2, BPOW3-3 and
BPOW3-4 (Wells Monitor NYAW Seaman's
Neck Well Field)**



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Notes and Abbreviations:

Samples were not collected from BPOW4-1 and BPOW4-2 in 2014 due to well abandonment/construction activities by NAVY

TVOCs: Total Volatile Organic Compounds

ug/L = micrograms per Liter

Total VOCs= Sum of VOCs Detected

NORTHROP GRUMMAN SYSTEMS CORPORATION

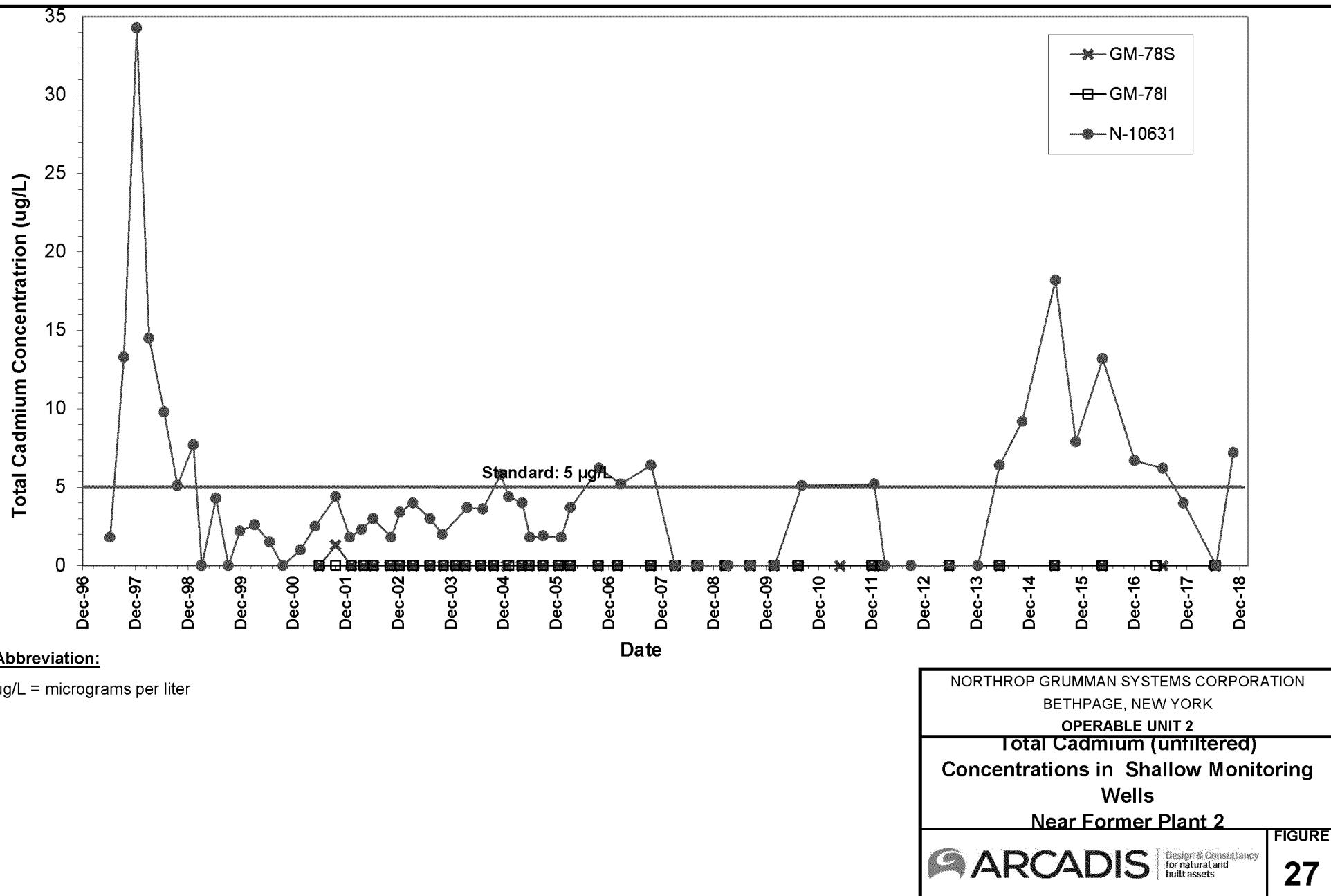
BETHPAGE, NEW YORK

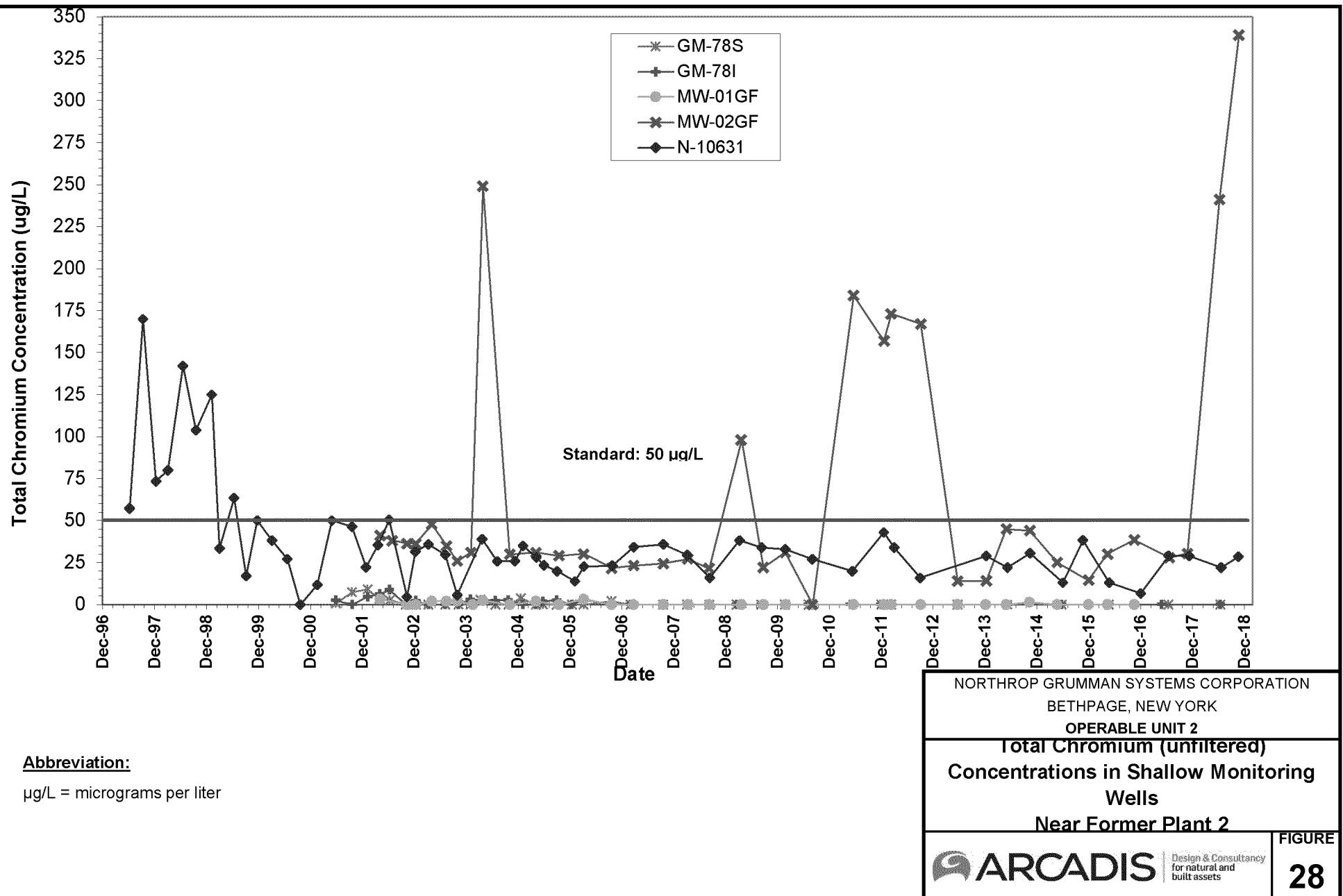
OPERABLE UNIT 2

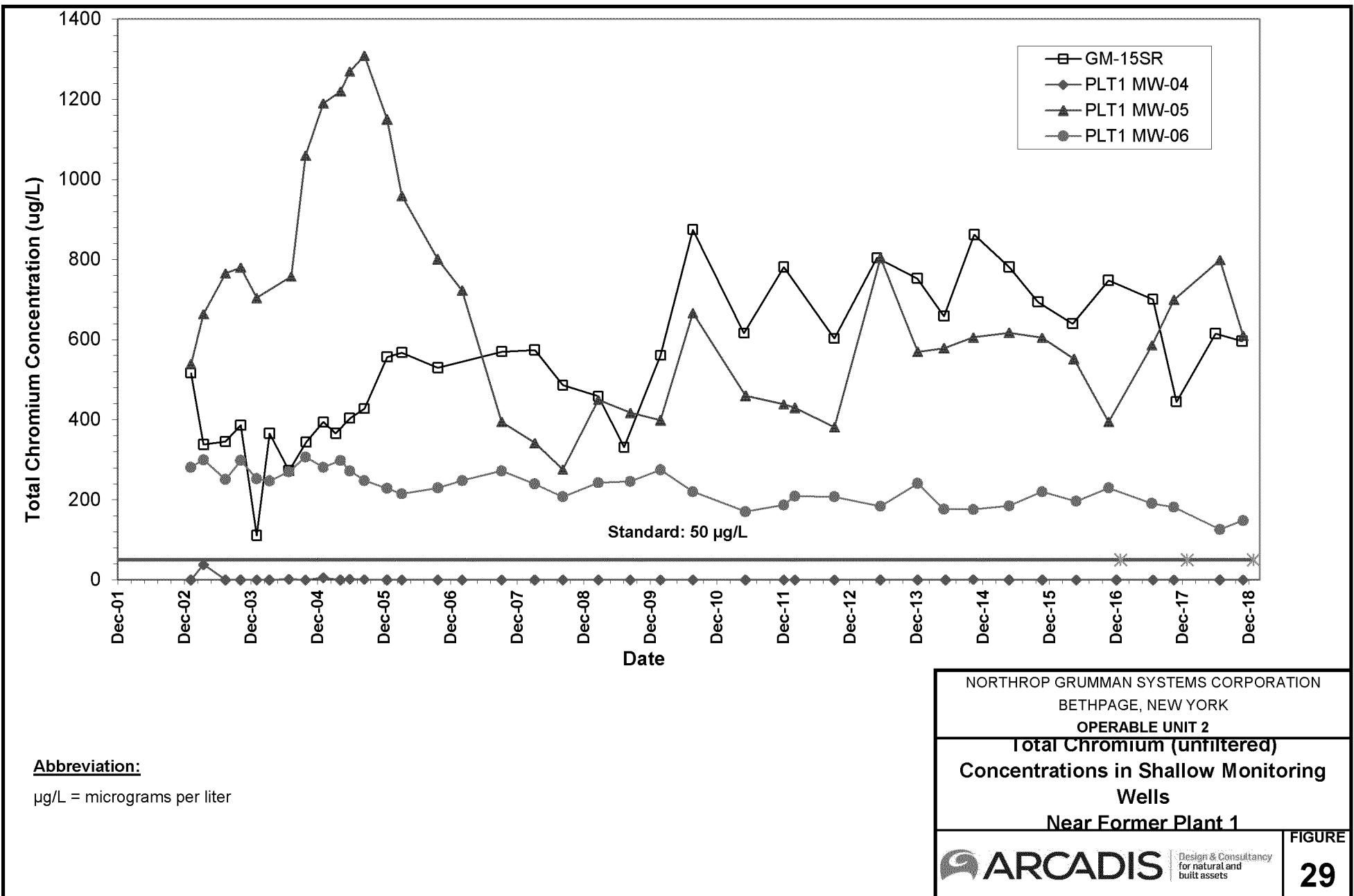
**Total Volatile Organic Compound
Concentrations in Outpost Wells BPOW4-
1R and BPOW4-2R
(Wells Monitor Town of Hempstead
Levittown Water District Well N-5303)**



26

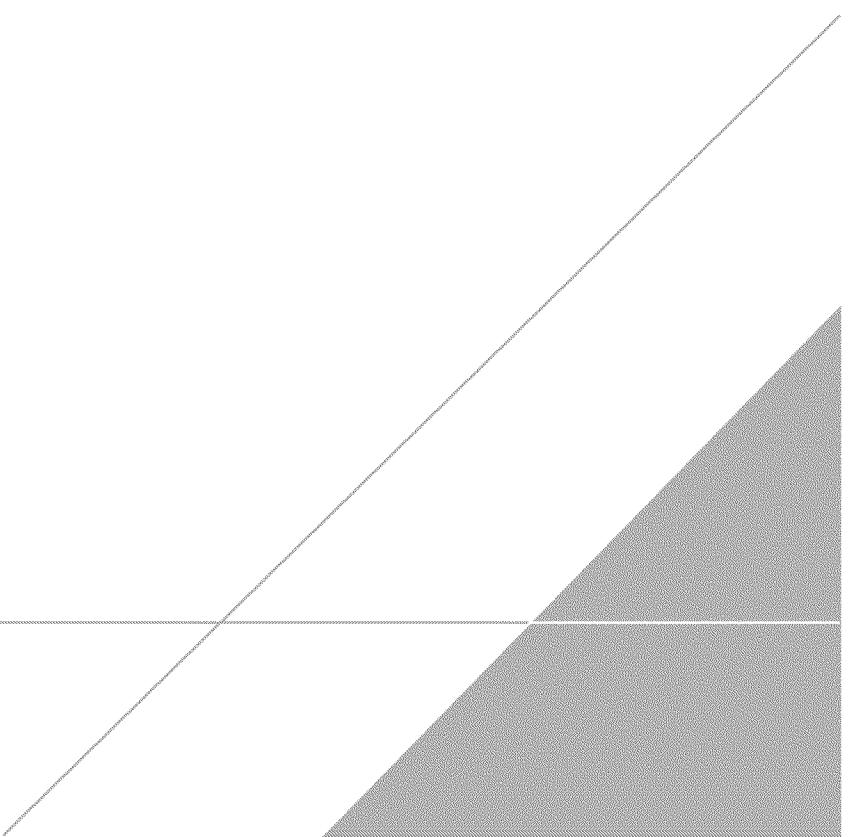






APPENDIX A

Daily and Monthly Logs



APPENDIX B

Hazardous Waste Manifests

APPENDIX C

OU2 ONCT System Capture Analysis for 2018



APPENDIX D

SPDES Discharge Monitoring Reports



APPENDIX E

2018 Groundwater Sampling Logs and Chain of Custody Records

APPENDIX F

Supplemental Trend Graphs



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